RAMSAY'S ARCHITECTURAL AND ENGINEERING CATALOGUE

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ERRATA

Page 4—E. Esdale & Sons should read:—"E. Esdaile & Sons."

Pages 136 and 334—The Sole Representative for Queensland should now read:—"Alfred Snashall, Anthon, Pty. Ltd., P.O. Box 284D, Brisbane."

Page 148—The complete sentence in the heading should read:—"See page 327 for complete list of Branches."

Pages 255-258—The exclusion of these pages from the Catalogue does not in any way destroy the sequence of the pages.

Page 349—In Section 6 "For Continuation of this Section, see page 531, etc.," should read:—"Page 523."

Page 419—The line drawing at the top of the page is by mistake reproduced upside down—it should also have been titled—"Tycos" Self-Acting Temperature Regulator applied to Hot-Water Service Tank."
Also under the heading "Bulbs and Control Ranges" a new paragraph should now be introduced, as follows:—"Steel bulbs can be supplied if specified."

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RAMSAY'S ARCHITECTURAL AND ENGINEERING CATALOGUE

A Compendium and Filing System of Catalogues of Manufacturers and Suppliers of Building Materials and Equipment

Editor:
WILLIAM L. RICHARDSON, B.Sc.

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PREFACE

THE second edition of Ramsay's Catalogue, now entitled "Ramsay's Architectural and Engineering Catalogue," is more comprehensive, and of even greater value than its predecessor. The mailing card, which was despatched to check up on addresses, brought enthusiastic and encouraging replies from all over Australia, proving once again very definitely that this Catalogue is now an integral part of every Architect's and Engineer's equipment.

As before, Ramsay's Catalogue is lent GRATIS to every practising Architect and Consulting Engineer in Australia for the purpose of providing them with an up-to-date standard work, containing complete reference to the use and scope of Building Materials and Equipment.

The criticisms on the last occasion, though very few, were none the less welcome, while the helpful suggestions were much appreciated. The recipients of this Catalogue can themselves do a great deal to assist the staff in the compilation of this work of reference. The more complete the Catalogue, the greater its value, therefore, if the book is of value to you, recommend it to those firms who have not so far made use of it for distributing their Catalogues. Criticisms and suggestions are also again invited.

We are pleased to record our appreciation of the painstaking efforts of the Editorial Staff, and in this connection offer our thanks to Colin J. Smith for his co-operation in the production of much of the Architectural and Engineering matter, also to James N. Edwards, Engineer, and B. Ainge-Johnson, Writer.

W. S. KENT HUGHES, B.A. (Oxon.)
for the Publishers.

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RAMSAY'S ARCHITECTURAL AND ENGINEERING CATALOGUE

1932-33 EDITION

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The material in the book has been indexed under several headings for quick and accurate reference.

1. Sectional Index (Inside Front Cover).
2. Index to Manufacturers—Page II and III
3. Index to Products—Page V.
4. Index to Trade Names and Trade Marks — Brands—(Inside Back Cover)
5. S.A.A. File Nos. (Generally under Page Nos. at either left or right-hand top corner).

S.A.A. Filing Numbers

The Standard Classification for Building Materials and Equipment, promulgated by the Standards Association of Australia, has been incorporated in this book for the purpose of introducing to the Architect this method of classifying and filing LOOSE pieces of literature which may be issued between editions of this Catalogue, and be filed under the 41 main divisions provided for in the classification.

Drawings, Details, Specifications and Technical Data

Knowing that drawings are of paramount importance and convey more information to the professional man than do other types of illustrations, the Architectural Staff have sought to produce these in a uniform style (using standard symbols), readily understood and containing as much building construction information as is necessary to detail the material or equipment in any working drawings.

Weights, performances, capacities, and similar data, which are recognised as being imperative to the successful installation of the products, have been supplied and tabulated wherever possible.

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STANDARDS ASSOCIATION OF AUSTRALIA

ESTABLISHED UNDER THE AEGIS OF THE COMMONWEALTH AND STATE GOVERNMENTS FOR THE PROMOTION OF STANDARDISATION AND SIMPLIFIED PRACTICE

SYDNEY (Headquarters): Science House, Gloucester and Essex Streets.
MELBOURNE: 61 Spring Street.
BRISBANE: Empire Chambers, cnr. Queen and Wharf Streets.
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PERTH: Chief Mechanical Engineer's Office, W. Aust. Government Railways, Midland Junction.
HOBART: Hydro-Electric Department.
NEWCASTLE: Howard Smith Chambers, Watt Street.

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Standardisation

Standardisation is firstly the process of defining what qualities a product should possess, what performance it is capable of giving, and what tests are necessary in order to ensure that it will comply with these essential conditions, and secondly, of promoting the adoption of this criterion so that production and purchase are concentrated upon a product of efficient production and satisfactory performance. "Standardisation combines at once the user's needs and the maker's ability to supply."

In this way everyone dealing with the product speaks a common language. The terms used are understood without ambiguity, the accepted methods of testing prevent argument as to quality and performance; the manufacturer knows what is the nature of the demand, and can plan efficient production; the importer has a reliable basis of ordering without personal inspection or the submission of samples, and the consumer is safeguarded without the necessity for drafting an intricate specification of his own.

How Standards are Made

The Standards Association does not commence work on a project on its own initiative. It does not seek to impose on technical and commercial interests its own ideas as to how work should be done. It awaits a request from an authoritative source—an industrial organisation or a large purchasing department or corporation—and, after making certain that those concerned really desire that a standard should be issued, it provides a means for preparing the standard by co-operative effort. Its unchallenged impartiality has won the complete confidence of all sections. Being a truly national organisation with no interest of its own to serve, it provides a safe meeting ground for all interests—producer, distributor and user. The actual drafting of specifications is undertaken by committees and conferences formed of representatives of all these interested parties from all parts of the Commonwealth.

Technical and Commercial Standards

Broadly, there are two branches of standardisation as undertaken by the S.A.A.—technical and commercial. In practice the two merge with no clear line of demarcation, but the average project falls so readily into one or other of the groups, calling for somewhat different treatment, that a subdivision is desirable in the interests of efficient operation.

Hitherto the grouping has been on the basis of "Standardisation" and "Simplified Practice," but by evolution the latter has become rather a branch of standardisation applied to general commodities, for which highly technical requirements and tests are not essential. Whilst, therefore, the original classification drew a line between the processes of standardisation and simplification, the present distinction is one rather of degree and method of standardisation. Technical standards are, generally, those applying to industrial purchasing, particularly on large-scale orders, and involving the specifying of technical features of manufacture, such as chemical composition, physical qualities and so forth. On the other hand, commercial standards, though particularly suited for use in bulk purchasing, may refer to commodities such as are found in the retail trade, and are concerned more with the simplification of excessive variety than with the technical features of production. They may, however, cover a very wide range, from commercial documents to farm produce, textiles or domestic hardware.

The Scope of Standardisation

In both branches of work, the standards may assume various forms, such as specifications of quality or performance of ranges of sizes of specific dimensions where interchangeability is the objective, of nomenclature or grading or of rules of procedure. Whilst uniformity with all its saving of inconvenience and unnecessary waste is the primary objective, there are two directions in which a rigid restraint is exercised. A standard should specify what is necessary to secure the needs of the user with as little interference as possible with the processes by which the manufacturer produces the desired product. Further, there should be a minimum of invasion of that field in which the added cost of variety is justified by the need for ministering to the æsthetic development and mental susceptibilities of the community.

AUSTRALIAN STANDARD SPECIFICATIONS

(1) TECHNICAL STANDARDS

A.—CIVIL ENGINEERING

Publication No.

[illegible]

A. 4—Hydrated Lime.

B.—MECHANICAL ENGINEERING

Publication No.

B.1 (See Nos. B. 35 to 38)

B. 2—1928. T.—Copper Tubes (Suitable for Screwed Connections and Compression Joints or Brazed Joints. For Pressures up to 200 lbs. per sq. inch).

B. 3—1928. T.—Rubber Conveyor and Power Transmission Belting.

B. 4—1931.—Vegetable Tanned Leather Belting.

[illegible] 1932.—Marking and Colouring of Tanned [illegible]

Publication No.

B. 35 [illegible] 38. 1931.—Water Supply and Sanitary Fittings.

[illegible]—Specifications and Designs of [illegible]

[illegible]

B. 38—Specifications and Designs for Metal Alloy Sanitary Fittings (for use with Soil and Waste Pipes).

C.—ELECTRICAL ENGINEERING.

Publication No.

C. 1 (a and b).—1926. T.—Electrical Voltages and Frequencies. (Gratis.)

C. 2—1925. T.—Electrical Performance of Traction Motors (Direct Current, Series Wound).

C. 3 to 11—1925. T.—Overhead Line Wire Material for Telegraph and Telephone Purposes (Excluding Galvanized Iron Wire).

C. 3—Hard Drawn Copper Wire.

Publication No.

C. 4—Bronze Wire.

C. 5—Copper Binding and Jointing Wire.

C. 6—Copper Tapes and Binders.

C. 7—Bronze Tapes and Binders.

C. 8—Copper Jointing Sleeves, Nos. 1, 1a, 2, 2a, 3, 3a, 4, 4a, 5, 5a, 6, 6a, 7, 7a, 8, 8a, and 9.

C. 9—Bronze Jointing Sleeves, Nos. 9, 9a, 10, 10a, 11, 11a, 12, 12a, 13 and 13a.

C. 11—Tinned Copper Jointing Sleeves, Nos. 15, 16, 17, 18, 19 and 20.

C. 12—1928.—Telephone Cable, Paper-Insulated, Lead Covered.

C. 13—1930. Switchboard Bus-bars and Connections Standard Marking for (including arrangement thereof for three phase systems).

C. 17—1926. T.—Terms and Definitions Used in Connection with Telegraphs and Telephones.

C. 18—1926. T.—Bare Annealed Copper Wire for Electrical Machinery and Apparatus. Specification for Dimensions and Resistances of

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Publication No.

C. 19—1926. T.—Slate Slabs for Electrical Purposes.

C. 20—1926. T.—Moulded Flat Top Insulating Bushes. Dimensions for.

C. 21—1928. Enamelled Plain Copper Wire for Electrical Instruments and Apparatus. Insulation, Dimensions and Resistances of.

C. 22—1926. T.—Water Tight Glands for Electric Cables.

C. 23—1930.—Air-Break Knife Switches and Laminated Brush Switches for Voltages not exceeding 660 Volts.

C. 24—1930.—Air-Break Circuit Breakers for Voltages not exceeding 660 Volts.

C. 25—1930.—Flame-Proof Air-Break Switches for Voltages not exceeding 660 Volts.

C. 26—1930.—Flame Proof Air-Break Circuit Breakers for Voltages not exceeding 660 Volts.

C. 27—1930. T.—Totally Enclosed Air-Break Circuit Breakers for Voltages not exceeding 660 Volts.

C. 28—1926. T.—Totally Enclosed Air Break Switches for Voltages not exceeding 660 Volts.

C. 29—1926. T.—Metallic Resistance Materials for Electrical Purposes.

C. 30—1926. T.—Drum Controllers and Resistances for use Therewith for Electric Motors (D.C. and A.C. Slip Ring).

C. 31—1926. T.—Face Plate Controllers and Resistances for use Therewith for Electric Motors (D.C. and A.C. Slip Ring).

C. 32—1926. T.—Contactor Controllers and Resistances for use therewith for Electric Motors (D.C. and A.C. Slip-Ring). (Excluding Controllers for Traction Purposes).

C. 33—1926. T.—Drum Starters for Electric Motors (D.C. and A.C. 3 phase induction with Slip Rings).

C. 34—1927. T.—Electrical Performance of Industrial Electric Motors and Generators with Class A Insulation.

C. 35—1927. T.—Electrical Performance of Large Electric Generators and Motors (Excluding Alternators of the Steam Turbine Driven Type), Rating Permitting Overloads.

C. 36—1927. T.—Electrical Performance of Large Electric Generators and Motors (excluding Alternators of the Steam Turbine Driven Type), Continuous Maximum Rating.

C. 37—1926. T.—Steam Turbines for Electrical Plant. (Corrigendum).

C. 38—1927. T.—Electrical Performance of Alternators of the Steam Turbine Driven Type.

C. 39—1927. T.—Electricity Meters. (Corrigendum Addendum, February, 1928.)

C. 40—1930. Pressboard for Electrical Purposes.

C. 41—1930. Hard-Drawn Copper Stranded Circular Conductors for Overhead Power Transmission Purposes.

C. 42—1930. Indicating Ammeters, Voltmeters, Wattmeters, Frequency and Power-Factor Meters.

C. 43—1927. T.—Parallel Sided Carbon Brushes for D.C. Commutator Machines.

C. 44—1927. T.—Tramway Axles.

C. 45—1928. T.—Instrument Transformers.

C. 46—1927. T.—Liquid Starters for Electric Motors (D.C. and A.C. 3-phase Induction with Slip Rings).

C. 47—1927. T.—Star-Delta Switch Starters for Electric Motors (A.C. 3-phase Induction without Slip-Rings).

C. 48—1927. T.—Multiple Switch Starters for Electric Motors (D.C.).

C. 49—1927. T.—Contactor Starters for Electric Motors (D.C. and A.C. 3-phase Induction with Slip-Rings).

C. 50—1928. T.—Insulated Annealed Copper Conductors for Electric Power and Light (Including Voltage Tests). Dimensions of.

C. 51—1928. T.—Vulcanised Fibre for Electrical Purposes.

Publication No.

C. 52—1928. T.—Bus-Bars and Connections Constructed of Bare Copper or Aluminium.

C. 53—1928. T.—Fixed Condensers for Radio Purposes.

C. 54—1930.—Graphic (Recording or Chart Recording) Ammeters, Voltmeters and Wattmeters.

C. 55—1928. T.—5-Ampere Two Pin Wall Plugs and Sockets for Domestic Purposes (Without Earthing Connection).

C. 56—1929. T.—Electric Cable Soldering Sockets.

C. 59 and 60—1931. Distilled Water and Sulphuric Acid for use in Secondary Batteries.

C. 59.—Distilled Water for Use in Secondary Batteries.

C. 60—Sulphuric Acid for use in Secondary Batteries.

C. 61—1931.—Transformers for Power Lighting, Electrical Performance of.

E.—TRANSPORTATION

Apply to Secretary for Complete list)

H.—NON-FERROUS METALLURGY

Publication No.

H. 1 and 3. 1931.—Soft Solders and Cored Solders.

H. 1. Soft Solders (Grades A, B, C, D, E, F, G, F, J).

H. 2.—Cored Solder (Rosin Filled).

K.—CHEMICAL INDUSTRY

Publication No.

K. 1, 2, 3. Sampling and Analysis of Plain Steels, Alloy Steels and Pig Iron. Standard Methods of.

K. 2 to 6. 1928. Linseed Oil.

K. 2. Raw Linseed Oil.

K. 3. Refined Linseed Oil.

K. 4. Pale Boiled Linseed Oil.

K. 5. Boiled Linseed Oil.

K. 6. Linseed Oil for Varnish.

K. 7 and 8. 1928. Turpentine.

K. 7. Turpentine.

K. 8.—Mineral Turpentine.

K. 9 to 10—1928.—White Lead.

K. 9. Genuine Dry White Lead.

K. 10. Genuine White Lead in Oil.

K. 11. 1929.—China Wood Oil (Tung Oil).

K. 12 and 13. 1929. Perilla Oil and Soya Bean Oil.

K. 12. Perilla Oil.

K. 13. Soya Bean Oil.

K. 14 to 16. 1929.—Varnishes.

K. 14. Interior Oil Varnish.

K. 15. Exterior Oil Varnish.

K. 16.—Flatting or Rubbing Oil Varnish.

K. 17 and 18. 1929. Zinc Oxide.

K. 17. Zinc Oxide Dry.

K. 18. Zinc Oxide in Oil (Genuine Zinc White).

K. 19. 1929. Genuine Red Lead, Dry.

K. 20—1929. Lithophone.

K. 21 to 26. 1930. Barytes.

K. 21.—Barytes.

K. 22. Lane Fine.

K. 23. Calcite.

K. 24. Whiting.

K. 25.—Kaolin.

K. 26. Talc.

K. 27. 1929. Linseed Oil Putty.

K. 28 and 29. 1930. Benzol and Toluol.

K. 28. Benzol.

K. 29. Toluol.

K. 30 & 31. 1930. Methylated Spirits Special Industrial Manufacture.

K. 30. Special Industrial Alcohol.

K. 31. Butyl Alcohol.

K. 32, 33, 34, 35. 1930. Ethyl Acetate, Butyl Acetate and Amyl Acetate.

K. 32. Ethyl Acetate.

K. 33. Butyl Acetate.

K. 34. Amyl Acetate.

K. 35 to 37—1930. Acetone, Methyl Acetone and Methyl Ketone.

K. 35. Acetone.

K. 36. Methyl Acetone.

K. 37.—Methyl Ethyl Ketone.

K. 38—1928. T.—Orange Shellac.

K. 39—1928. T.—Grass Tree Resin.

K. 40—1929. T.—Ready Mixed Linseed Oil Paint, Red Oxide of Iron.

K. 41—1931. Chromic Oxide.

Publication No.

CODES

B.—MECHANICAL ENGINEERING.

CB. 1—1931.—S.A.A. Boiler Code (and Australian Specifications B 1 to 9 and requirements). Price, 1/- Post Free, 10/3.)

CB. 4—1931.—S.A.A. Code for Compressed Gas Cylinders (and Relative Specifications B 10, 11, 12 and 13).

CB. 9—1931.—S.A.A. Pump Test Code.

C.—ELECTRICAL ENGINEERING.

Publication No.

CC. 1.—No. 1931. S.A.A. Wiring Rules.

K.—CHEMICAL INDUSTRY

Publication No.

CK. 1. 1929.—S.A.A. Safety Code for the Use of Paints.

I.—COMMERCIAL STANDARDS

(Simplified Practice Recommendations)

Publication No.

SPR. 1. 1931. Three Ply Wood Panels for Use in Stock Door Manufacture.

SPR. 2—1931.—Building Materials and Equipment, Classification for. (Price, 2/- Post Free, 2/3.)

SPR. 3. 1931. Sheet Metal Fittings for Exteriors of Buildings.

SPR. 4—1931. Road Gulley Gratings.

SPR. 5. 1931.—Fibrous Plaster Sheets.

II.—REPORTS.

Publication No.

PS. 1—1927.—Power Alcohol as a Potential Source of Power within the Commonwealth of Australia, prepared by the Power Survey Sectional Committee (Corrigendum).

PS. 2—1928.—Progress in the Development of Combustion of Victorian Brown Coal; prepared by the State Electricity Commission of Victoria and approved by the Australian National Committee for presentation to the World Power Conference, Fuel Conference, London, September 24—October [illegible], 1928.

PS. 3—1929. The Coal Resources of Australia; prepared by the Power Survey Sectional Committee. (Price, 5/- Post free, 5/6)

IV.—MISCELLANEOUS PUBLICATIONS

Publication No.

MP. 1—1931. Elimination of Waste—Simplified Practice in Australia. (Gratis.)

WORK IN HAND

Work is proceeding on the following subjects:

- Terra Cotta Roofing Tiles.
- Colour Pigments for Use with Portland Cement.
- Cast Stone.
- Cement Wash Troughs.
- Colliery Equipment.
- Electrical Equipment and Accessories.
- Concrete Pipes.
- Sanitary Cisterns and Pedestals.
- Roadmaking Materials and Nomenclature.
- Grading of Timbers.
- Steel Castings for Tramway Track work.
- Coach Screws.
- Typography Code.
- Laminated Steel Springs.
- Shovels.
- Banking Documents.
- Commercial and Technical Paper Sizes.
- Equipment and Materials for Public Institutions.
- General Conditions of Contract and Tendering.
- Street and Road Nameplates and Building Numbers.
- Pipe Fittings.
- Packing Cases for Fruit.
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  - Reinforced Concrete Structures.
  - Refrigeration.
  - Steel in Building.
  - Welded Structures.
  - Fire Protection.

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SECTION A

[Containing S.A.A. Filing Sections Nos. 1 and 2]

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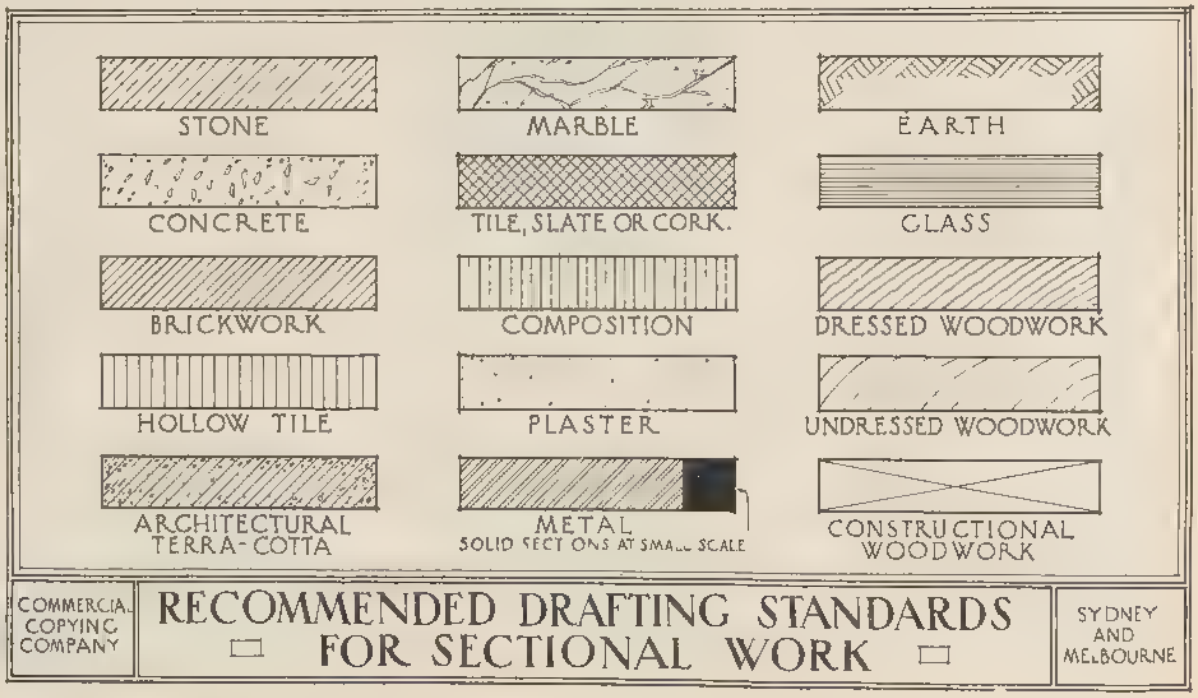

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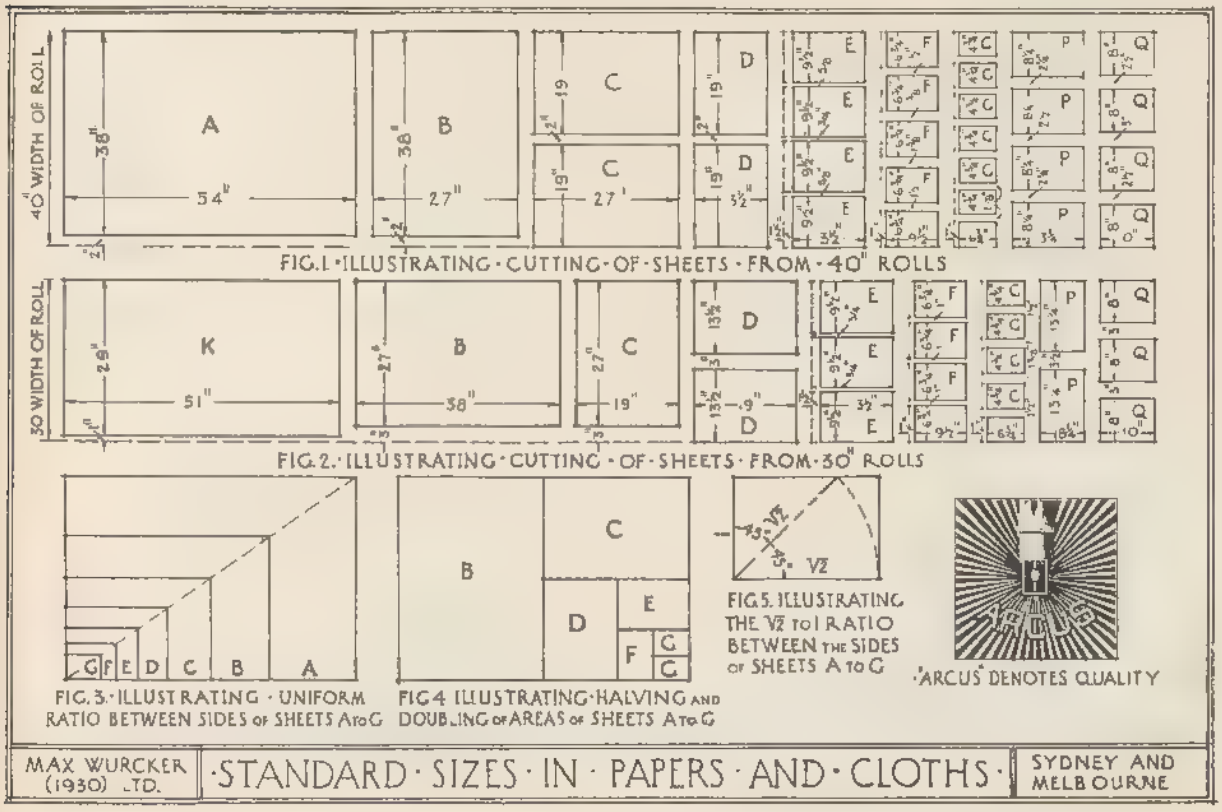

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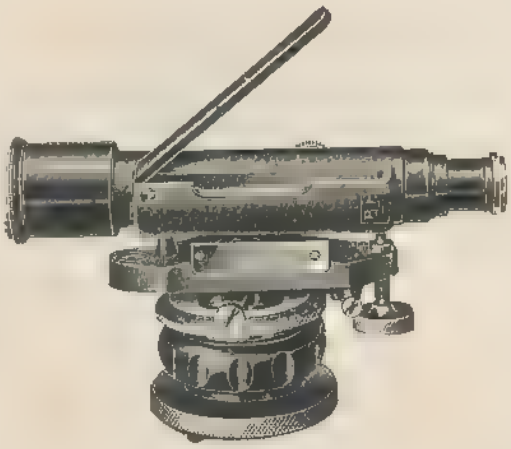
Modern levels are now obtainable, so constructed that the telescope is no longer attached rigidly to the vertical axis of the instrument, but is fixed in such a way that it can be tilted by means of a slow-motion screw till it is brought truly horizontal as indicated by the bubble. This is a much more accurate method of levelling, as the bubble is viewed from the eye-end of the telescope and the observation is made at the moment of reading the staff. The Quick-set Level incorporates this feature with a quick-setting ball-base, which quickly levels the instrument approximately



WATTS QUICK-SET LEVEL
The Ideal Instrument for the Architect and Engineer.

Other features are: A telescope that reads .01 of a foot at 300 ft.; a graduated circle divided to degrees for laying out angles; and an extreme portability — the instrument, case and tripod weighing only 11½ lbs., this combined with a threefold 9 ft. levelling staff is easily carried by one man.

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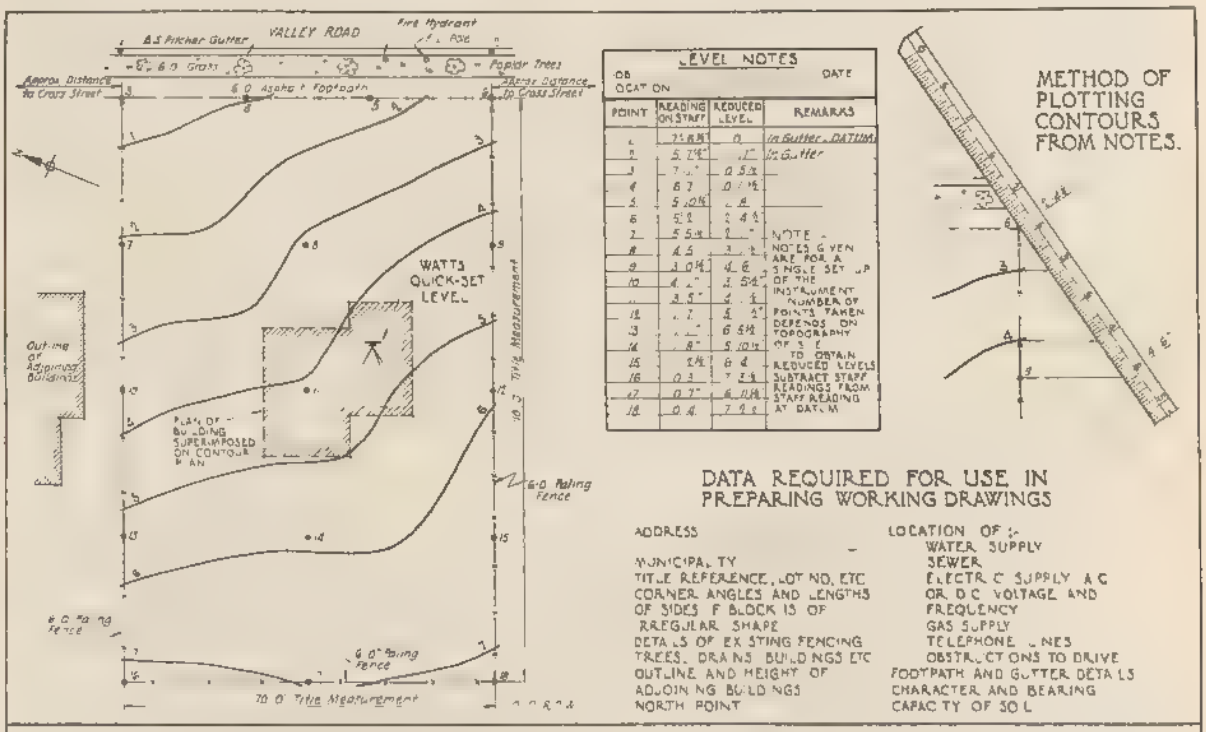

RECONNAISSANCE SURVEY OF A BUILDING SITE

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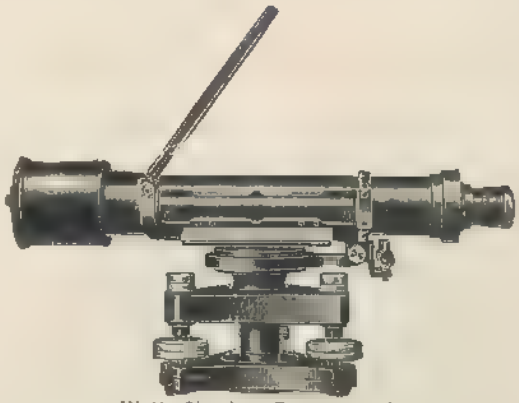

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The importance of good equipment in the drawing office is recognised by most architects and engineers as an aid to rapid, accurate and efficient production of designs, drawings, etc. Slide rules in a large variety of sizes and types are carried in stock. Drawing instruments, including compasses, bow pens, spring dividers and compasses, scales, etc., are stocked in various types and may be had singly or made up into sets.

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The planimeter is used for measuring areas that have been drawn to scale. The operation, while quite simple, is based on mathematical facts and the results obtained are of a highly accurate order

Chesterman Steel Tape.

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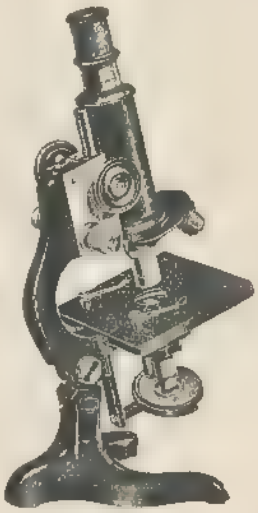
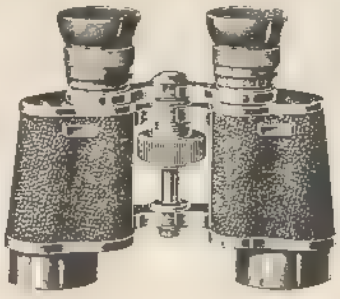
Microscopes. Special attention is given to Microscopists and Nature Students in a separate department which carries a large stock of both new and used microscopes by the world's leading makers. Microscope accessories, mounting material, nature and microscopical books, and slides are also featured in this department



Barometers.—Wall types for fitting into an interior decorative scheme are available in a great variety of designs; also altitude indicating instruments for tourists, etc., also pocket aneroids for surveyors and tourists for ascertaining altitudes, grades or elevations

Anemometers. These sensitive instruments are used for measuring the velocity of air currents, in ventilating shafts, coal mines, rooms, ducts, flues, etc.

N. H. Seward Pty. Ltd. are also suppliers of Telescopes Binoculars and Field Glasses by leading makers, and always have a large selection, including look-out telescopes suitable for homes by the seaside and in the mountains, where long views are obtainable This firm is also equipped to deal with repairs to all classes of optical and scientific instruments



Field Glasses and Binoculars

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1a

S.A.A. File No.

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(JAMES WHELAN)

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The removal of old buildings in the congested portions of the city, and even elsewhere, is usually entrusted to firms who are experienced specialists as wreckers, rather than to building contractors.

Whelan the Wrecker, who has specialised in all classes of wrecking operations during the past forty years, is fully competent to undertake large or small demolishing work presenting difficult or unusual features. Some of the largest of Melbourne's oldest structures, being in a precarious condition at the time of demolition, have been—without loss of a single life or limb—successfully and rapidly demolished to make way for buildings of a more modern design.

Careful study of wrecking and cleaning up costs and accurate estimating of the existing materials which may be salvaged, enables Whelan the Wrecker to submit a definite and competitive quotation on any wreckage job.

An Outstanding Example of Difficult Demolition Work carried out by Whelan The Wrecker—The Gas Retort House (100 ft. x 300 ft. long) at West Melbourne Gas Works.

Sometimes it is permissable to reuse portion of materials of the existing building in the new structure on the same site. A thorough knowledge by the Wrecker of the value of these materials is then essential, as he may be able to place before the architect such information which may effect a substantial economy in cost to the owner.

Building Materials Available

Owing to the careful salvaging of his wrecking gangs and to his transportation and yarding facilities, Whelan the Wrecker has available, in his two big yards in Sydney Road, a quantity of sound secondhand building materials suitable for reuse in new work where economy is of importance. These materials, covering a full range of carefully-cleaned bricks, structural steel, galvanised iron, timber, tiles, etc., are all in good condition and are available at reasonable rates.

SHORT FORM WRECKING CONTRACT AS RECOMMENDED BY JAMES WHELAN

I agree to demolish and remove the existing structure belonging to and situated at , for the sum of £ , according to the conditions of the attached specification and under your supervision

(Signed) James Whelan

Accepted by

Architect *Date*

When the existing building has some salvage value the following is recommended:—

I agree to pay the Owner the sum of £ , and demolish and remove the existing structure belonging to , and situated at , according to the conditions of the attached specifications and under your supervision

Accepted by *(Signed) James Whelan*

Architect *Date*

ARCHITECT'S SPECIFICATION FOR A TYPICAL WRECKING SUB-CONTRACT

GENERAL.

The whole of the work in this contract shall be carried out under the supervision of the architect and to his entire satisfaction.

Payment shall be made on completion under a certificate in writing signed by the architect.

REGULATIONS, FEES AND PERMITS.

The Demolisher shall give notice in writing to the * . . . . . before commencing any work.

*The City Council or other body having jurisdiction over the work

The Demolisher shall secure all necessary permits and pay all necessary fees and comply with all by-laws and regulations of authorities having jurisdiction over the work.

PROTECTION OF PUBLIC.

The Demolisher shall provide and erect all temporary elevated platforms or roofed passageways over footpaths and all other constructions necessary to secure the safety or convenience of the public.

Note.—If the above forms part of the General Contractor's work modify the paragraph accordingly

INSURANCE.

The Demolisher shall carry all necessary insurance to render the owner free from all damage or loss to workmen or to the public that may be occasioned by the work of this contract.

FOOTPATH CROSSING.

The footpath crossing fee shall be paid by the Demolisher and, on evidence of payment, it will be refunded to him by the Owner. The design of the footpath crossing shall be subject to the approval of the Architect as well as in conformity with all Municipal Regulations.

CONTENTS OF THE BUILDING

Such articles as ladders or any other loose furniture shall not be considered any part of the building and may be removed by the Owner.

DEMOLITION.

The present building upon the site shall be removed entirely to the top of existing foundation. All the old material shall become the property of the Demolisher and shall be removed by him from the premises.

Note.—If certain materials or parts of the structure are to be salvaged or reused, modify the above paragraph accordingly.

The Demolisher will note that certain walls are party walls and that the interests and rights of the adjoining Owner/s must be observed. No damage shall be done to these walls by careless cutting or tearing out.

DEBRIS.

All debris and rubbish shall be cleaned up and removed from the site.

SEALING SERVICES.

Any water, gas, or sewer pipes, and electrical cable shall, if necessary, be disconnected and sealed in accordance with the rules of any bodies having jurisdiction over these services.

TIME OF COMPLETION

A limit of . weeks shall be allowed for the demolishing and clearing of the site and the completion of this contract. A penalty not exceeding ... . . per day shall be enforced at the Architect's discretion, if time of completion exceeds this limit

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

SECTION B

[Containing S.A.A. Filing Sections Nos. 3, 4, 5, 6, 8 and 9

MASONRY MATERIALS

CONCRETE — HYDRATED LIME — BRICKWORK — STONEWORK AND ARCHITECTURAL TERRA COTTA

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

3f

S.A.A. File No.

N.S.W. STATE BRICKWORKS

Office:
BRIDGE ROAD, PYRMONT
Works:
HOMEBUSH BAY
Telephone: MW 1785, MW 1804.

FACE AND MOULDED BRICKS

Products

Commons, Patent and Dome Kiln.
Seconds and Clinkers.
Face, extensive variety of colours and sizes.
Fancy Moulds.
Fancy Moulds Specials, made to design.
Rough Cast Bricks, various sizes and colours.

Facilities

The works are situated at Homebush Bay and enjoy every facility for quick and efficient delivery, being served by water carriage as well as by rail.

Delivery to distant suburbs is provided by rail, but supply can be given to city jobs, also those in the Eastern and Western suburbs, direct by up-to-date motor lorries, which deliver the bricks in boxes. Besides preserving the quality of the bricks, due to a minimum of handling, builders appreciate the benefit of receiving the bricks in boxes as they are able to hoist them and deposit them exactly where required. In many cases bricks are placed alongside the bricklayers on the highest city buildings, and from the time that they have been loaded from the kilns at the yard are not handled again until received by the bricklayers.

The box method is also very adaptable for supplies by water carriage

Range

The works are in a very favourable position to supply a comprehensive range of face and moulded bricks, as there are fifteen down draft kilns in operation. A very extensive business has been built up in the moulded brick department, and reference to the various moulds displayed herein will furnish some idea of the revived demand for ornamental brickwork.

Architects should note that, in addition to the moulds displayed, practically any shape or size can be manufactured to design submitted.

In all cases where moulded bricks are specified ample notice should be supplied by the builder, owing to the difficulty in stocking this class of ware in all colours and designs. Rough texture bricks in regular sizes are stocked. A popular size for fireplace design is also available, viz.—6½ x 1½ x 3¼. They can also be used to advantage in other architectural designs which will readily be appreciated by craftsmen

Bricks measuring 10 inches in length, adaptable for soldier courses, can also be obtained

Quality

The products from this Undertaking can safely be used for all classes of building construction The whole of the bricks used in Railway construction, where most of the work is of an exacting nature, have been supplied from this source. They completely satisfy all standards, as regards appearance, crushing strain, etc. It may be pointed out that the whole of the bricks used in the City Railway for retaining walls, underground tunnels, subways, ect., amounting to many millions, were supplied from the Homebush Bay Works. Many of the largest buildings also testify to their popularity.

Architectural Brick Development

Although other materials, such as concrete, sandstone, trachyte, etc., all have a place in architectural design, the beauty of good brickwork, with a colour range all of its own, will never lose its power of appeal.

This Undertaking has for some time realised the necessity of widening the scope of its Face and Moulded Brick departments, and has succeeded in producing a very wide range of colours, which give very pleasing results, both in plain or mixed colour schemes. Recently there has been quite a revived demand for moulded bricks, as many as thirty different moulds having been used on a single building on several occasions. A glance at the colour panels and fancy moulds displayed should prove interesting. The panels shown herein were, of course, selected to furnish some idea of the colours stocked, also the scope existing for the very fine colour treatment that can be applied to brickwork. It will be readily appreciated that many other effects, quite as pleasing, can be readily arranged. The works are always in a position to supply large quantities of face bricks on short notice, but, as previously mentioned, orders for moulded bricks, especially those to an Architect's own design, should be submitted about four or five weeks before they are required, in order to allow time for preparation of moulds, and the requisite period for burning

SERVICE TO ARCHITECTS

Every effort is made to give full satisfaction to clients. Although the yard is situated about ten miles from the city the journey can be made in less than thirty minutes by car, and, prior to the commencement of any contract, it has proved a very wise policy for the Architect and Builder concerned to attend and select the bricks required. A visit can always be arranged on the shortest notice to the Head Office, Bridge Road, Pyrmont.

REFERENCES.

A few of the contracts supplied by this undertaking are set out below:—

Coronation Hotel, Park Street, Sydney.
Oxford Hotel, Bridge and Lyons Roads, Drummoyne, N.S.W
Court House Hotel, Oxford Street, Darlinghurst, N.S.W
Kentish Hotel, Broadway, Glebe, N.S.W.
Croydon Park Hotel, Georges River Road, N.S.W
Earlwood Hotel, Earlwood, N.S.W
Hotel St. James, Market and Elizabeth Streets, Sydney
Rose Bay Hotel, N.S. Head Road, Rose Bay, N.S.W
McIrath's Building, Pitt and Goulburn Streets, Sydney
Presbyterian Church, Wynyard Square, Sydney.
Santa Sabina, The Boulevarde, Strathfield, N.S.W
St. Bede's, Church of England, Drummoyne, N.S.W
Christian Brothers, Albert Road, Strathfield, N.S.W
St. Mark's Church, Tranmere Street, Drummoyne, N.S.W.
St. Joseph's Church, Liverpool Rd. and Baker St., Enfield, N.S.W
Stella Maris Convent, Long Bay, N.S.W.
"The Chequers," Redmyre Road, Strathfield, N.S.W
"Hampden Court" Flats, Darlinghurst, N.S.W
"Brook House," O'Connell Street, Sydney
"Watson House," Bligh Street, Sydney
Grace Building, York Street, Sydney.
N.S.W. Govt. Savings Bank, Castlereagh Street, Sydney
Bebarfalds' Building, George Street, Sydney
Minehan's Building, Park Street, Sydney.
Manchester Unity Building, Castlereagh Street, Sydney
Animal House, University, Sydney.
B.M.A. Building, Macquarie Street, Sydney

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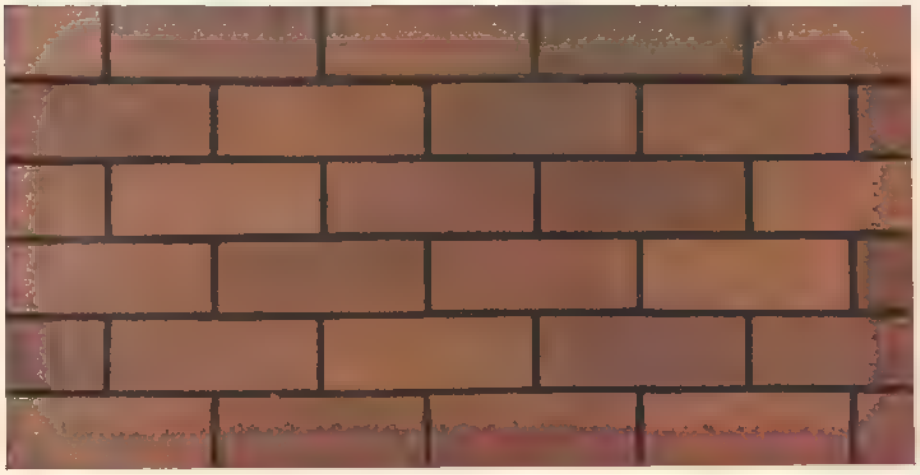


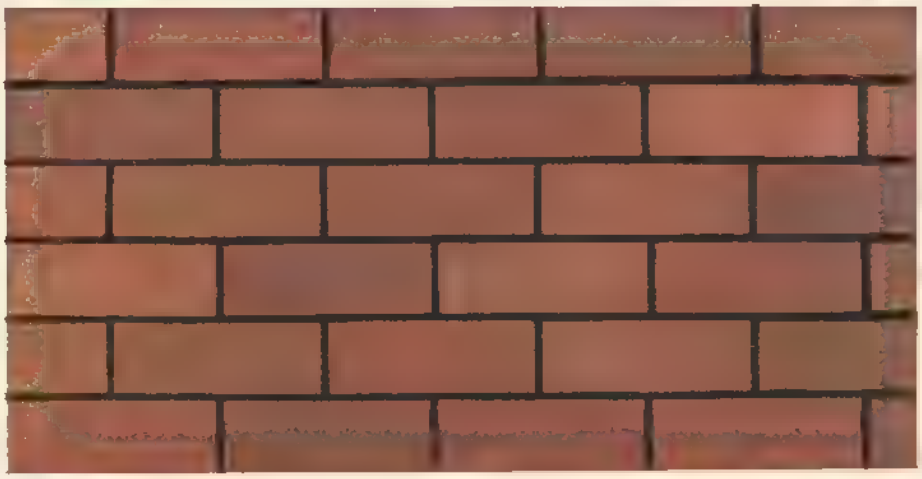
Pleasing effects obtained with a wide range of colours and the use of coloured mortars.

Panel No. 1 (above)

Panel No. 2 (at right)

Panel No. 3 (below)

Panels Nos. 4, 5 and 6 are shown on a later page)



There is no limit to the uses of face brick from the simplest bungalow to the most elaborate office building

(Continued on next page)

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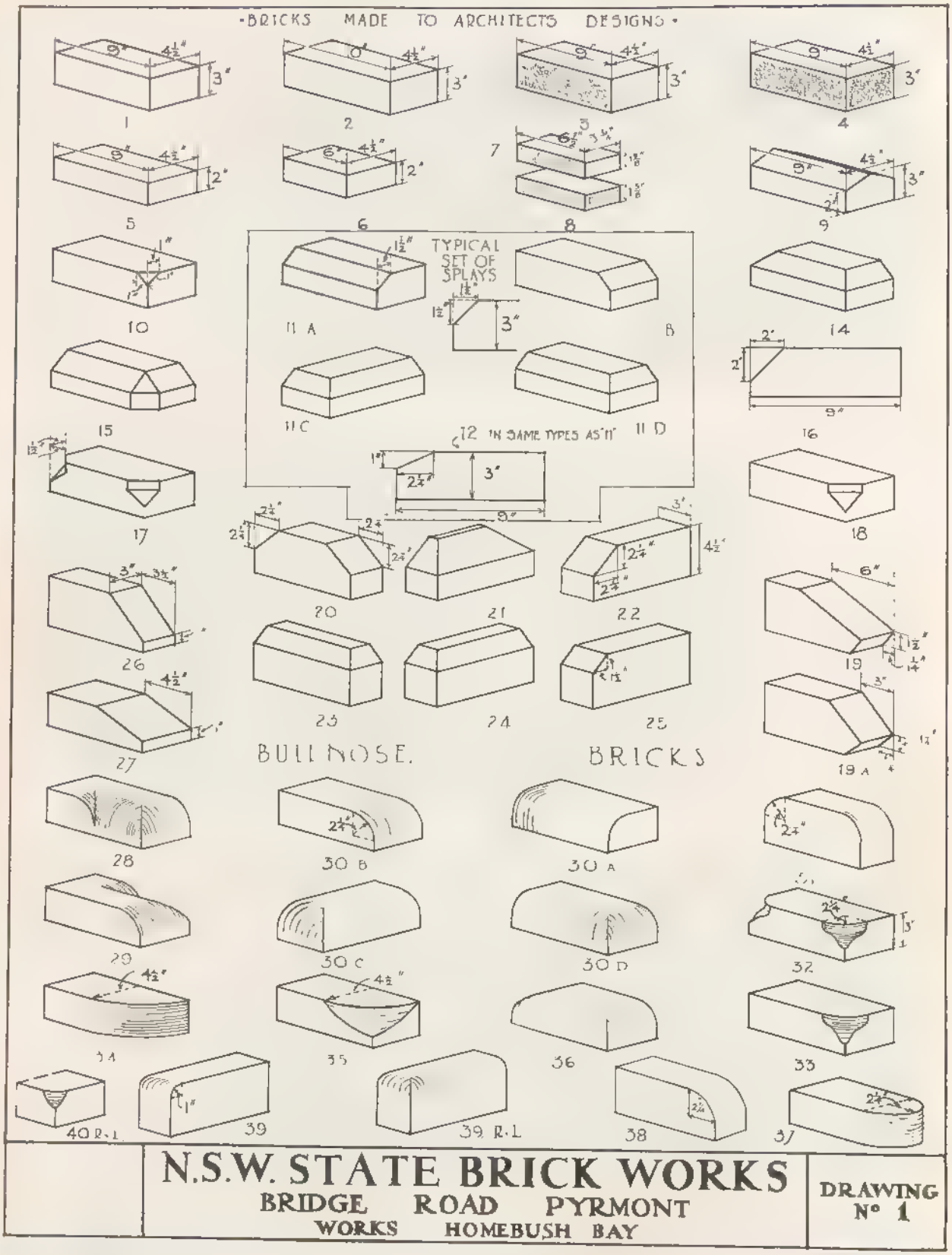

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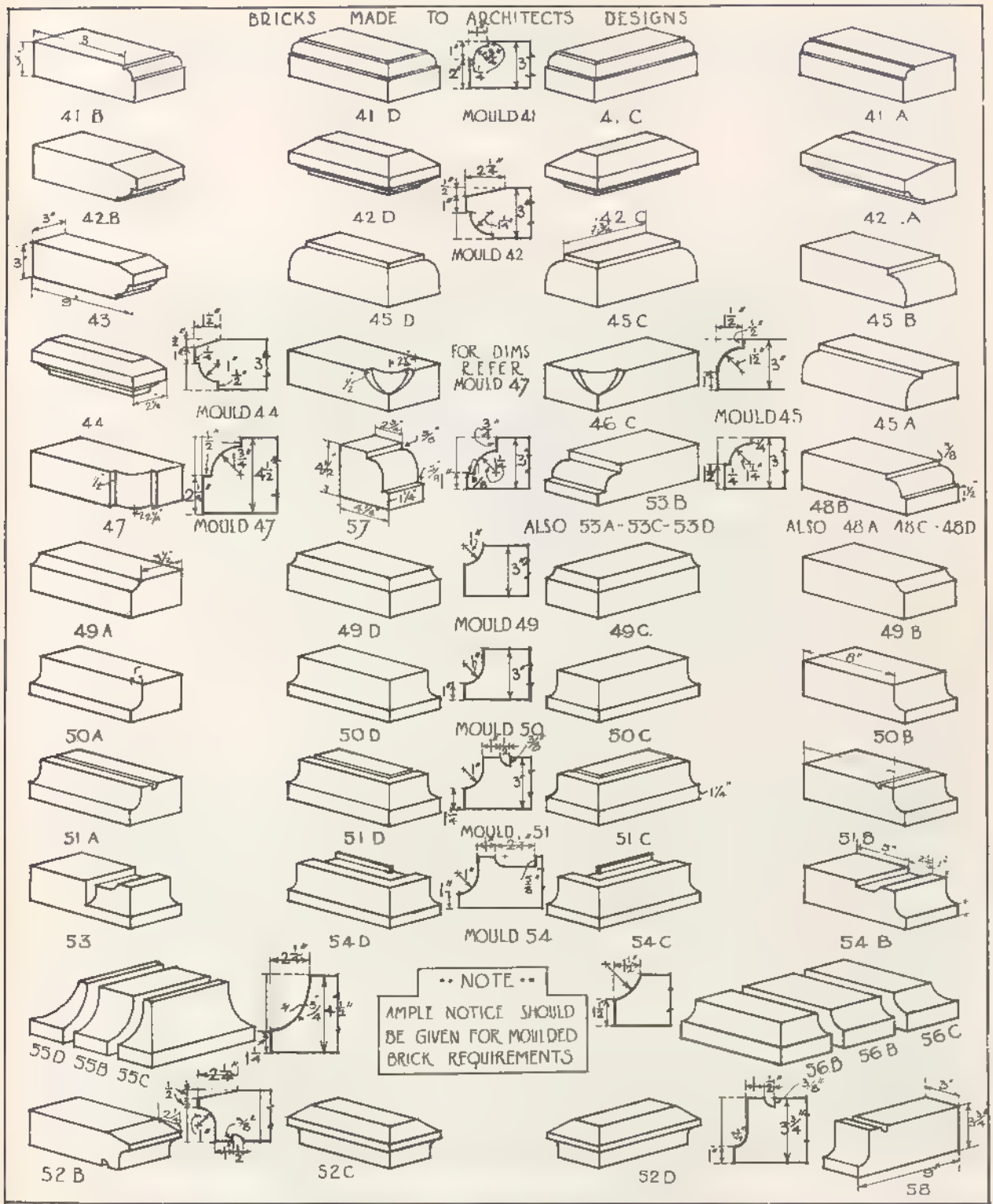

N.S.W. STATE BRICK WORKS

BRIDGE - ROAD PYRMONT

WORKS HOMEBUSH BAY

DRAWING Nº 2

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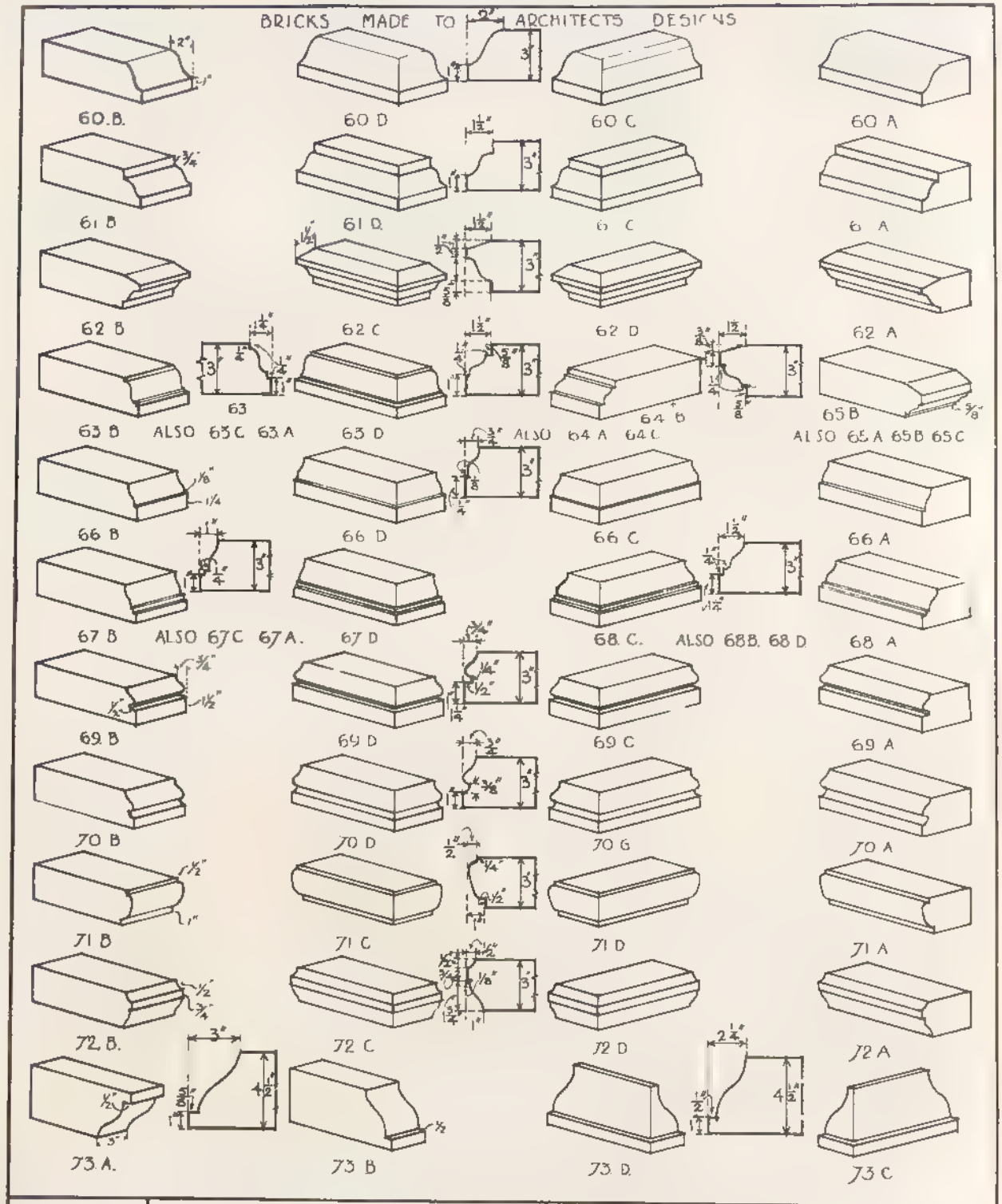

N.S.W. STATE BRICK WORKS

BRIDGE ROAD PYRMONT
WORKS HOMEBUSH BAY

DRAWING № 3

(continued on next page)

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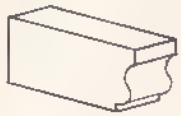
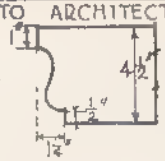
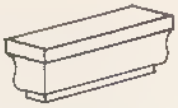
BRICKS MADE TO ARCHITECTS DESIGNS



75 B

75 D





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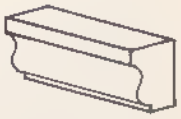

75 A

75 E

77 D

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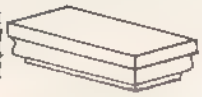

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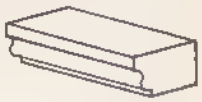

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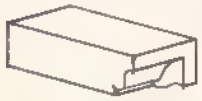

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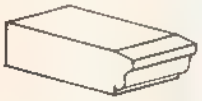
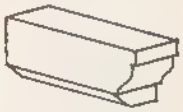
Panel No. 4

77 B



78 B



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ALSO 78A 78C 78D

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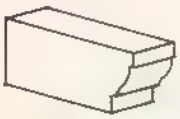

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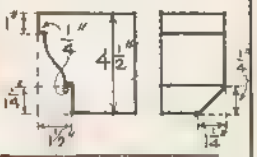

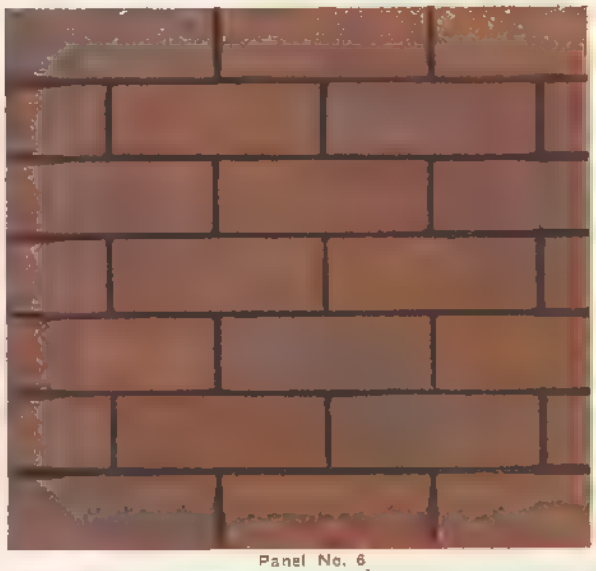

Panel No. 6

Panel No. 5

N.S.W. STATE BRICK WORKS

BRIDGE ROAD PYRMONT

WORKS HOMEBUSH BAY

DRAWING № 4

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3f

WUNDERLICH LIMITED

Manufacturers of

Wunderlich "Colortex" Bricks

Administration: BAPTIST STREET, REDFERN, SYDNEY, N.S.W

Showrooms and Offices:

SYDNEY, Baptist Street, Redfern.
STH MELBOURNE: 210 Hanna Street.
ADELAIDE: Grote and Morphett Streets.
PERTH: Lord and Short Streets
BRISBANE: Amelia Street, Valley.
NEWCASTLE Builders' Exchange, King St
HOBART: 139 Macquarie Street.
LAUNCESTON, 71 St John Street

(For Other Products, See Index.)

Description

Wunderlich "Colortex" Bricks are Face Bricks with a textured finish, and are available in a range of colour harmonies never offered previously to the Australian Building Industry. They are made from natural clays burned to extreme hardness

Colours

The beautiful and distinctive shades of Wunderlich "Colortex" Bricks are due to the careful selection and blending of the clays, and the expert application of intense firing There are available colour harmonies of red, brown, yellow and green, as exemplified in the illustration below The effects vary from dull matt to a high flash. By the intermingling of various colour harmonies and flashed effects, endless combinations are possible

Texture

The standard surface finish is a vertical rough texture (see illustration), but we can supply various other textures, to order.

Standard Sizes

"Colortex" Bricks are made in two standard sizes

9 in x 4½ in x 3 in and 9 in. x 4½ in. x 2 in.

In addition, we can readily manufacture special moulded forms, thus affording the architect unusual freedom in the designing of base and string courses, architraves, door-jambs, corbels, etc

Architectural Possibilities

The real significance of "Colortex" Bricks is that they enable the architect to achieve, with a standard architectural medium, those much admired chromatic and textural effects which have previously been possible only by the employment of a material made specially to order.

Ideal for Facades

Using "Colortex" Bricks, it is possible to impart particular attractiveness and colour richness to a facade treatment, without adding noticeably to the cost of the structure

Display Panels

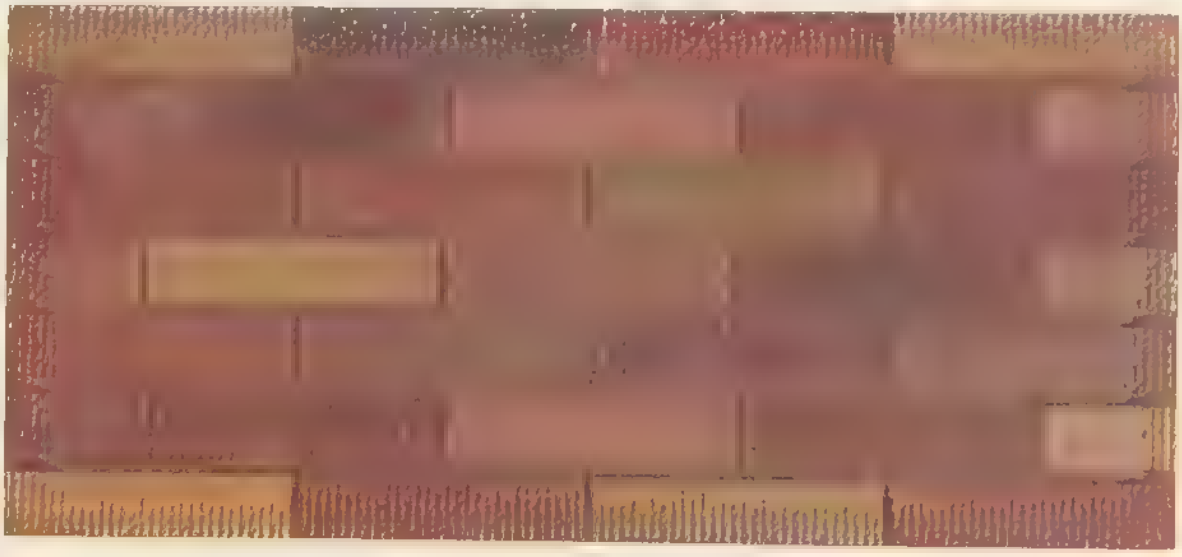
At our Showrooms, we have assembled a variety of panels displaying some of the effects attainable with "Colortex" Bricks Architects desiring to make a selection are invited to inspect these displays

Prices

It is not possible to quote reliable prices, on account of different conditions operating in the various States, but architects can obtain this information promptly by applying to our nearest Sales office

Fireplace Briquettes

Also available are Wunderlich Briquettes, for fireplaces. Like "Colortex" Bricks, these can be obtained in numerous colour harmonies and glazed effects. Blueprints showing suggested applications will be furnished on request. Samples are on view at our Showrooms.



This illustration, reproduced from colour photographs of the actual product, demonstrates the wide range of colour harmonies available in Wunderlich "Colortex" Bricks. The example shown is composed of the smaller standard size, viz., 9 in. x 4½ in. x 2 in.

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A. C. M. A.

THE AUSTRALIAN CEMENT MANUFACTURERS' ASSOCIATION

The Australian Cement Manufacturers' Association is the service organisation of the Portland Cement Manufacturers of Australia

HEAD OFFICE, YORKSHIRE HOUSE, 14 SPRING STREET, SYDNEY

BRANCH OFFICE: TEMPLE COURT, COLLINS STREET, MELBOURNE

4

FACTORS IN MAKING GOOD CONCRETE

Observance of the Water Cement Ratio Law

This law was evolved by Professor Duff Abrams, of the Lewis Institute, Chicago, who, as a result of some thousands of experiments, found that the strength of concrete was controlled by the relative proportions of water and cement, other factors being equal.

This law applies within the limits of workability in the mix, and the effect of excess mixing water is clearly shown in Fig. 1.

EFFECT OF QUANTITY OF MIXING WATER ON THE COMPRESSIVE STRENGTH OF CONCRETE

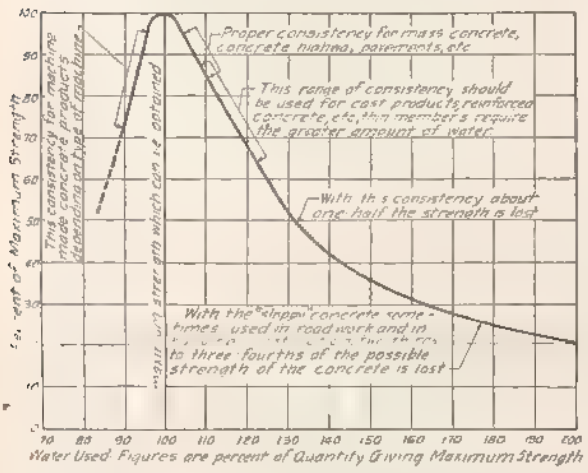

Fig. 1.—Note. In general construction, the maximum strength can rarely be obtained, but it is possible to obtain 70 to 90 per cent. of the maximum strength without additional expense by restricting the quantity of mixing water.

The use of about 2½ gallons of water per bag of cement (94 lbs.) makes a paste that can be stiffly moulded. Water in excess of this amount renders the mix more plastic, but has the effect of diluting the paste and reducing the potential strength, as will be readily seen in Fig. 2.

Because of variations in the moisture content, absorption and grading of the aggregate, the exact amount of water that will be required for a given mixture and given consistency cannot usually be specified in advance. However, approximate quantities applicable to usual conditions are given in the following table.

APPROXIMATE QUANTITY OF MIXING WATER REQUIRED FOR CONCRETE.

Mix		Approximate Mix as Usually Expressed			Water Required (Imperial Gallons per bag of Cement)	
Cement	Volume of Aggregate After Mixing	Cement	Aggregate: Fine	Aggregate: Coarse	Minimum	Maximum
1	3	1	1½	2½	4½	4¾
1	4	1	1½	3	4½	5
1	4½	1	2	3	4¾	5¼
1	5	1	2	4	5	5½
1	5½	1	2½	5	6	6½
1	7½	1	3	6	6¾	7½

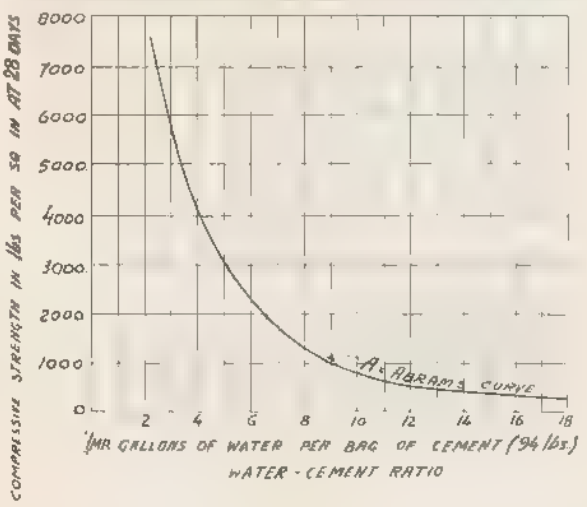

Fig. 2. Relation between compressive strength of concrete and its water content showing results of Abrams' tests on a large number of mixes ranging from 1—15 to neat cement. Data taken from Bulletin 1, Structural Materials Research Laboratory, Chicago, Illinois.

Consistency

Consistency is a general term relating to the character of the mix with respect to its state of fluidity. Consistency embraces the entire range of fluidity from the driest to the wettest possible mixtures, and requires a qualifying term for definition.

The term "plastic" is used to describe a consistency of freshly-mixed concrete, which can be readily moulded, but which changes form slowly when the mould is removed. A mass that is plastic does not crumble. It flows sluggishly and without segregation.

(Continued on next page)

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The term "workability" is used with reference to concrete mixtures to describe the ease or difficulty which may be encountered in placing the concrete in a particular location. It involves not only the thought of a consistency of concrete, but also the condition under which it is to be placed—size and shape of the member, spacing of the reinforcement rods, or other details interfering with the ready filling of the forms. A stiff plastic mixture, with large aggregate, which is workable in a large open form, would not be workable, for example, in a thin wall of complicated reinforcing details.

The consistency of a concrete mix is easily measured and regulated by what is known as the slump test. By using this test on the job, the quantity of mixing water used in the concrete can be controlled fairly closely. The only apparatus needed to effect the slump test is a metal sheet form shaped like the frustum of a cone 4 in. in diameter at the top and 8in. at the bottom and 12in. high. A metal rod of ⅝in. diameter and 21in. long is also required. This equipment can be made at a small cost by any tinsmith.

Measuring the slump

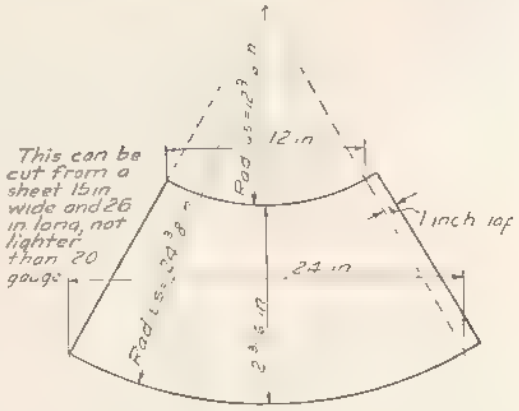

Fig. 3.—Diagram for cutting metal to make the frustum of a cone used for the slump test

The concrete to be tested is placed in the metal sheet form in layers about 4in. deep. Each layer is worked with the pointed metal rod until the cone is filled and struck off level. In order to secure uniform results, each layer should be rodded exactly 25 times. The cone form should then be lifted off immediately, and the mass allowed to settle until quiescent and the settlement or slump measured.

Concrete having a slump of ¼in. to 1in. will contain only a little more water than necessary for maximum strength, but will be too stiff for most construction work. Such concrete is said to have a relative consistency of 1.00. Concrete containing 10 per cent. more water is said to have a relative consistency of 1.10, and will give a slump test of three to four inches; 50 per cent. more water gives a relative consistency of 1.50, with a slump of 8 to 10 inches.

The illustration shows a typical relation between relative consistency and slump.

The following maximum slumps are recommended:

Types of Concrete	Maximum Slump
Mass concrete	2 inches
Reinforced concrete	
Thin vertical sections	6 inches
Heavy sections	2 inches
Thin confined horizontal sections	8 inches
Roads and pavements	
Hand finished	4 inches
Machine finished	[illegible] inch
[illegible]	[illegible] inch

Fig. 5.—DIAGRAM SHOWING TYPICAL RELATIVITY BETWEEN CONSISTENCY AND SLUMP

The tags on each pile indicate the relative consistency of each pile. The scale at the side shows the slump in inches.

(Continued on next page)

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TABLES OF QUANTITIES OF MATERIALS FOR CONCRETE

Accurate knowledge of the quantities of materials required for given volumes of concrete of different proportions is of fundamental importance. The purpose of these tables is to give quantities of cement, fine and coarse aggregate per cubic yard of concrete for a wide range in proportions, consistency, and gradings of aggregate.

The tables presented herewith take into account the fundamental factors which affect the volume of concrete; the volume of solids in the cement and aggregate, and the volume of mixing water. It is obvious that the volume of concrete is equal to the volume of solids in the aggregate, plus the solids in the cement, plus the quantity of mixing water, so long as there is a negligible quantity of unfilled voids or entrained air. Plastic, workable mixtures suitable for ordinary uses fulfil this condition.

USE OF TABLES

To use the tables it is necessary to know the proportions by **separated volume, weight or mixed volume,** the quantity of mixing water (including the moisture in the aggregate) and the voids in the aggregate **in the condition in which they are used.** With this information the quantities can be read directly from the tables. The procedure varies depending upon the terms in which the proportions are stated. The application of the tables to the determination of quantities for proportions stated by the different methods is described in what follows.

Proportions by Separated Volumes

The tables are designed for use primarily with proportions stated in terms of separated volumes and may be used directly under such conditions.

Quantities may be found by simple interpolation for mixtures, quantities of water and void contents not appearing in the tables.

Proportions by Weight

If the proportions are stated in terms of weight it is necessary to take into account the specific gravity and moisture content of the aggregate to determine what value of voids to use in applying the tables. The value of voids used for this purpose is an abstract quantity which bears no necessary relationship to the actual void content of the aggregate. The determination of the value to be used is made easy by reference to Table A.

TABLE A.—VOIDS TO BE ASSUMED WHEN USING TABLES FOR PROPORTIONS BY WEIGHT

Net Weight of Cement (lb. per cu. ft.)	Specific Gravity of Aggregate									
	[illegible]	2.1	2.2	2.3	2.4	[illegible]	2.6	2.7	2.8	2.9
[illegible]	27	29	32	[illegible]	[illegible]	41	44	[illegible]	[illegible]	48
[illegible]	28	32	35	[illegible]	[illegible]	42	[illegible]	47	[illegible]	[illegible]
8	31	34	37	40	42	45	47	[illegible]	[illegible]	52
2	34	37	40	[illegible]	[illegible]	46	[illegible]	[illegible]	53	54

Knowing the voids to be assumed, the tables will then be used in exactly the same manner as illustrated for "proportions by separated volumes," except that the quantities of aggregate in the tables are in terms of cubic yards, and **in the solution of problems involving mixtures by weight these values are to be considered as abstract numbers which must be multiplied by 1.13 to reduce them to tons.** The quantity of cement as given may be used directly.

Proportions by Mixed Volume

In applying the tables to proportions stated in terms of volume of mixed aggregate, reference should be made to the tables for which the sum of the volumes of fine and coarse aggregate is equal to the volume of mixed aggregate. The quantities may be read from the column for which the voids in the fine and coarse aggregate are the same as those in the mixed aggregate.

If the voids in the mixed aggregate are 30 per cent., the quantities will be found to be the same as for a mixture made up of a fine aggregate with 30 per cent. voids and a coarse aggregate with 30 per cent. voids. The volume of mixed aggregate will be the sum of the fine and coarse indicated in the table. The separate volumes of fine and coarse will not bear any relation, of course, to the proportions of the fine and coarse in the mixed aggregate.

DETERMINATION OF VOIDS

When the specific gravity, unit weight and moisture content are known the percentage of voids may be read directly from Table B.

TABLE B.—PERCENTAGES OF VOIDS FOR DIFFERENT SPECIFIC GRAVITIES AND UNIT WEIGHTS OF AGGREGATES

Net Weight of Aggregate (dry moisture content) lb. per cu. ft.	Percentage Voids for Different Specific Gravities						
	2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	189	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	12	[illegible]	[illegible]	4	[illegible]	[illegible]
[illegible]	[illegible]	8	11	[illegible]	[illegible]	18	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	4	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	20	[illegible]	[illegible]	[illegible]	32	35

DETERMINATION OF QUANTITY OF MIXING WATER

The quantity of mixing water shown in the tables as gallons per bag of cement, includes the moisture contained in the aggregates. It is necessary therefore, when determining the amount of mixing water used, to add to the quantity measured for the batch the amount of water already present in the aggregates.

In the absence of accurate information, the following values are recommended in the Portland Cement Association's pamphlet "Design and Control of Concrete Mixtures."

APPROXIMATE QUANTITY OF FREE WATER CARRIED BY AVERAGE AGGREGATES

Condition of Aggregate	Approx. quantity of free water
Very wet sand	[illegible] to [illegible] gal. per cu. ft.
Moderately wet sand	about [illegible] gal. per cu. ft.
Moist sand	about [illegible] gal. per cu. ft.
Moist gravel or crushed rock	about [illegible] gal. per cu. ft.

The coarser the aggregate the less free water it will carry.

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QUANTITIES OF MATERIALS PER CUBIC YARD OF CONCRETE

Mix by volume as used on job

Quantities in table expressed volumetrically as follows.—Bags of cement, Cubic Yards of Fine Aggregate (F.); Cubic Yards of Coarse Aggregate (C.)

Accuracy of tables depends on manner and care of determining voids in aggregates; voids must represent job conditions

Quantities are net, no allowance made for waste. If essential data are assumed correctly and there is no waste quantities given in tables furnish the required volume or slightly greater if air is entrained

Quantities for percentages of voids and proportions other than those shown in tables may be interpolated

Quantities of mixing water include moisture in aggregate

The minimum quantity of mixing water shown in the table will produce a dry mixture, and the maximum quantity a wet mixture for average conditions

NOTE.—Bags of cement refer to paper bags of 1 cubic ft capacity or 24 to the ton.

If cement is supplied in jute bags of 1 1/3 cubic ft capacity or 18 to the ton multiply the figures given under column "Cement Bags" by 3/4 to obtain the number required

TABLE NO. 1 — 1 : 1 : 2 Concrete

VOIDS IN SAND, PER CENT

Voids in Coarse Aggregate per cent	[illegible]		[illegible]		35		[illegible]		[illegible]		[illegible]	
	Cement Bags	Aggregate Cu Yd F	Cement Bags	Aggregate Cu Yd F	Cement Bags	Aggregate Cu Yd F	Cement Bags	Aggregate Cu Yd F	Cement Bags	Aggregate Cu Yd F	Cement Bags	Aggregate Cu Yd F
		C		C		C		C		C		C
3 GALLONS OF WATER PER BAG OF CEMENT												
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4 GALLONS OF WATER PER BAG OF CEMENT												
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
5 GALLONS OF WATER PER BAG OF CEMENT												
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
6 GALLONS OF WATER PER BAG OF CEMENT												
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
7 GALLONS OF WATER PER BAG OF CEMENT												
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

(Continued on page [illegible])

TABLE NO. 2 — 1 : 1½ : 3 Concrete

VOIDS IN SAND, PER CENT.

Voids in Coarse Aggregate per cent	[illegible]		[illegible]		35		[illegible]		[illegible]		45		50	
	Cement Bags	Aggregate Cu Yd F	Cement Bags	Aggregate Cu Yd F	Cement Bags	Aggregate Cu Yd F	Cement Bags	Aggregate Cu Yd F	Cement Bags	Aggregate Cu Yd F	Cement Bags	Aggregate Cu Yd F	Cement Bags	Aggregate Cu Yd F
		C		C		C		C		C		C		C
4½ GALLONS OF WATER PER BAG OF CEMENT														
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
5 GALLONS OF WATER PER BAG OF CEMENT														
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
5½ GALLONS OF WATER PER BAG OF CEMENT														
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
6 GALLONS OF WATER PER BAG OF CEMENT														
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
6½ GALLONS OF WATER PER BAG OF CEMENT														
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[See also page 17 for further explanation on the use of these Tables]

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QUANTITIES OF MATERIALS PER CUBIC YARD OF CONCRETE

Mix by volume as used on job.

Quantities in table expressed volumetrically as follows:—Bags of cement; Cubic Yards of Fine Aggregate (F), Cubic Yards of Coarse Aggregate (C).

Accuracy of tables depends on manner and care of determining voids in aggregates, voids must represent job conditions.

Quantities are net, no allowance made for waste. If essential data are assumed correctly and there is no waste, quantities given in tables furnish the required volume or slightly greater if air is entrained.

Quantities for percentages of voids and proportions other than those shown in tables may be interpolated.

Quantities of mixing water include moisture in aggregate.

The minimum quantity of mixing water shown in the table will produce a dry mixture, and the maximum quantity a wet mixture for average conditions.

NOTE. Bags of cement refer to paper bags of 1 cubic ft. capacity or 24 to the ton.

If cement is supplied in jute bags of 1 1/3 cubic ft. capacity or 18 to the ton, multiply the figures given under column "Cement Bags" by 3 to obtain the number required.

TABLE NO. 3 — 1 : 2 : 3 Concrete

VOIDS IN SAND, PER CENT

Voids in Coarse Aggregate per cent	[illegible]			35			40			[illegible]			[illegible]		
	Cement Bags	Aggregate Cu. Yd. F	Aggregate Cu. Yd. C	Cement Bags	Aggregate Cu. Yd. F	Aggregate Cu. Yd. C	Cement Bags	Aggregate Cu. Yd. F	Aggregate Cu. Yd. C	Cement Bags	Aggregate Cu. Yd. F	Aggregate Cu. Yd. C	Cement Bags	Aggregate Cu. Yd. F	Aggregate Cu. Yd. C
4 GALLONS OF WATER PER BAG OF CEMENT															
30	5[illegible]	[illegible]	62	5 8	43	6[illegible]	6 0	[illegible]	66	6 1	[illegible]	68	6 2	[illegible]	69
35	5 9	[illegible]	66	6[illegible]	[illegible]	67	6 2	46	68	6 3	47	[illegible]	6[illegible]	48	72
40	6 1	[illegible]	68	6 3	46	6[illegible]	6 4	47	7[illegible]	6 5	48	73	6 7	50	75
45	6 3	[illegible]	[illegible]	6 5	48	72	6 4	49	71	6 8	5[illegible]	76	7[illegible]	[illegible]	78
50	6 5	[illegible]	73	6 7	[illegible]	75	6 5	51	77	[illegible]	52	79	7 3	54	81
5 GALLONS OF WATER PER BAG OF CEMENT															
30	[illegible]6	42	62	5[illegible]	42	[illegible]	[illegible]	[illegible]	65	[illegible]	[illegible]4	67	6 1	46	68
35	5 8	43	64	5 9	44	66	6 1	47	67	6[illegible]	45	69	6 4	47	7[illegible]
40	6[illegible]	[illegible]	67	6 1	46	68	6 3	46	70	6 4	48	71	6 6	49	73
45	6[illegible]	46	69	6 4	47	[illegible]	6 5	48	[illegible]	6[illegible]	[illegible]	74	6 8	51	76
50	6 4	48	[illegible]	6 6	49	73	6 8	[illegible]	[illegible]	6 9	51	77	7 1	53	79
5½ GALLONS OF WATER PER BAG OF CEMENT															
30	5 5	41	61	5 6	42	63	5 8	[illegible]	64	5 9	41	66	6 0	45	6[illegible]
35	5 7	42	64	5 8	43	65	6[illegible]	41	66	6 1	47	68	6 3	46	69
40	5 9	44	66	6 1	45	67	6 2	46	69	6 3	47	70	6 5	48	72
45	6 1	45	68	6 3	46	69	6 4	47	[illegible]	6 5	48	73	6 7	50	75
50	6 3	47	70	6 5	48	72	6 6	49	[illegible]	6 8	50	76	6 9	52	77
6 GALLONS OF WATER PER BAG OF CEMENT															
30	5 4	4[illegible]	60	5 5	[illegible]	62	[illegible]	42	[illegible]	[illegible]	1[illegible]	[illegible]	[illegible]	[illegible]	66
35	5 6	[illegible]	62	5 7	43	64	[illegible]	[illegible]	65	6 0	5	67	6[illegible]	46	68
40	5 8	43	6[illegible]	5 9	44	65	6 0	[illegible]	68	6	46	69	6[illegible]	47	7[illegible]
45	6 0	[illegible]	66	6[illegible]	45	68	6 3	46	[illegible]	6 1	[illegible]	[illegible]	6 6	[illegible]	[illegible]
50	6 2	46	69	6 4	[illegible]	70	6 5	48	72	6 7	49	74	6 8	50	76

(Continued on next page)

TABLE NO. 4 — 1 : 2 : 3½ Concrete

VOIDS IN SAND, PER CENT

Voids in Coarse Aggregate per cent	[illegible]			[illegible]			40			45			50		
	Cement Bags	Aggregate Cu. Yd. F	Aggregate Cu. Yd. C	Cement Bags	Aggregate Cu. Yd. F	Aggregate Cu. Yd. C	Cement Bags	Aggregate Cu. Yd. F	Aggregate Cu. Yd. C	Cement Bags	Aggregate Cu. Yd. F	Aggregate Cu. Yd. C	Cement Bags	Aggregate Cu. Yd. F	Aggregate Cu. Yd. C
4½ GALLONS OF WATER PER BAG OF CEMENT															
30	[illegible]	[illegible]	69	5 4	[illegible]	70	7 5	41	[illegible]	5[illegible]	41	[illegible]	5 8	43	6
35	[illegible]	41	72	5 6	[illegible]2	73	5 9	43	[illegible]	5 9	44	76	6	41	68
40	[illegible]	42	[illegible]	5 9	43	[illegible]6	6 0	4[illegible]	[illegible]7	6 1	45	[illegible]	6 3	46	71
45	5 9	41	7	6 1	4[illegible]	[illegible]	6	46	8[illegible]	6 3	47	82	6	[illegible]	74
50	[illegible]	6	80	6	47	82	6 6	48	84	6 9	49	86	6 8	[illegible]	78
5 GALLONS OF WATER PER BAG OF CEMENT															
30	5 2	3	6[illegible]	[illegible]	[illegible]	69	5 4	40	7[illegible]	5 6	41	[illegible]	[illegible]	42	[illegible]
35	[illegible]	40	7	5 7	[illegible]	72	5 9	42	[illegible]	5 8	43	77	6 0	44	6[illegible]
40	5 6	42	73	5[illegible]	4[illegible]	[illegible]	[illegible]	44	7[illegible]	6[illegible]	[illegible]	78	[illegible]	46	[illegible]
45	5 8	43	6	6 0	4[illegible]	[illegible]7	6 1	45	79	6 2	46	81	6 1	[illegible]7	7[illegible]
50	6 1	4[illegible]	[illegible]	6[illegible]	46	80	6 1	[illegible]	[illegible]	6 5	[illegible]	8[illegible]	6 7	49	76
5½ GALLONS OF WATER PER BAG OF CEMENT															
30	[illegible]2	38	67	[illegible]	39	6[illegible]	5 4	40	7[illegible]	5[illegible]	40	71	5 6	[illegible]	6[illegible]
35	[illegible]	40	6[illegible]	5 7	40	[illegible]	5 6	41	7[illegible]	[illegible]	42	[illegible]	[illegible]	43	66
40	[illegible]	41	7[illegible]	5 6	42	73	5 8	43	75	5 9	44	76	6[illegible]	45	68
45	5 7	[illegible]	7	5 9	43	76	6[illegible]	44	[illegible]	6 1	46	80	6 3	46	71
50	[illegible]	[illegible]	[illegible]	6[illegible]	5	[illegible]	6 3	46	81	6 1	47	85	6[illegible]	48	73
6 GALLONS OF WATER PER BAG OF CEMENT															
30	15[illegible]	35	[illegible]6	5[illegible]	[illegible]8	67	5[illegible]	39	[illegible]	[illegible]	40	[illegible]	[illegible]5	41	61
[illegible]	[illegible]3	3	68	5	[illegible]	69	5 5	41	7	5 6	41	[illegible]	6[illegible]	43	61
[illegible]	7 1	[illegible]	71	[illegible]	4[illegible]	7[illegible]	5[illegible]	[illegible]	[illegible]3	5 8	42	7[illegible]	[illegible]	44	67
[illegible]	[illegible]6	[illegible]	[illegible]7	[illegible]	4[illegible]	71	5[illegible]	1[illegible]	76	6[illegible]	45	78	6 2	46	7[illegible]
50	[illegible]	[illegible]	[illegible]6	6 0	1	7[illegible]	[illegible]2	1[illegible]	79	6 3	[illegible]	81	[illegible]	1[illegible]	[illegible]
6 GALLONS OF WATER PER BAG OF CEMENT															
30	[illegible]	[illegible]	5	1	[illegible]	[illegible]6	[illegible]	35	[illegible]	[illegible]	[illegible]	68	5 1	10	61
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	68	5 4	10	[illegible]	[illegible]	1	[illegible]	5 6	12	[illegible]
[illegible]	5 1	[illegible]	6[illegible]	[illegible]	[illegible]	7[illegible]	5 6	[illegible]	7[illegible]7	[illegible]	[illegible]	71	5 8	43	66
[illegible]	5 6	[illegible]	[illegible]	6	[illegible]	[illegible]	5 8	43	75	[illegible]	[illegible]	[illegible]	6 0	[illegible]	68
50	[illegible]	1	71	5 8	[illegible]	76	6[illegible]	[illegible]5	78	6	45	81	6 3	7	[illegible]

[See also page 17 for further explanation on the use of these Tables]

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QUANTITIES OF MATERIALS PER CUBIC YARD OF CONCRETE

Mix by volume as used on job.

Quantities in table expressed volumetrically as follows:—Bags of cement; Cubic Yards of Fine Aggregate (F), Cubic Yards of Coarse Aggregate (C.)

Accuracy of tables depends on manner and care of determining voids in aggregates, voids must represent job conditions.

Quantities are net, no allowance made for waste. If essential data are assumed correctly and there is no waste, quantities given in tables furnish the required volume or slightly greater if air is entrained.

Quantities for percentages of voids and proportions other than those shown in tables may be interpolated.

Quantities of mixing water include moisture in aggregate

The minimum quantity of mixing water shown in the table will produce a dry mixture, and the maximum quantity a wet mixture for average conditions

NOTE.—Bags of cement refer to paper bags of 1 cubic ft capacity or 24 to the ton

If cement is supplied in jute bags of 1 1/3 cubic ft capacity or 18 to the ton multiply the figures given under column "Cement Bags" by 3 to obtain the number required

TABLE NO. 5 — 1:2:4 Concrete

Voids in Coarse Aggregate per cent	VOIDS IN SAND, PER CENT. 30			35			40			45			50		
	Cement Bags	Aggregate Cu Yd F	Aggregate Cu Yd C	Cement Bags	Aggregate Cu Yd F	Aggregate Cu Yd C	Cement Bags	Aggregate Cu Yd F	Aggregate Cu Yd C	Cement Bags	Aggregate Cu Yd F	Aggregate Cu Yd C	Cement Bags	Aggregate Cu Yd F	Aggregate Cu Yd C
4½ GALLONS OF WATER PER BAG OF CEMENT															
30	4.9	37	74	5.0	37	73	5.2	38	77	5.2	39	78	5.4	40	79
35	5.1	38	76	5.3	39	78	5.4	[illegible]	80	5.5	40	81	5.6	41	83
40	[illegible]	40	80	5.7	40	81	5.6	41	83	5.7	43	85	5.8	43	86
45	5.6	41	83	[illegible]	41	85	[illegible]	[illegible]	87	6.0	4	89	6.1	[illegible]	91
50	[illegible]	43	87	6.0	45	89	6.1	[illegible]	90	6.3	46	93	6.4	[illegible]	95
5 GALLONS OF WATER PER BAG OF CEMENT															
30	[illegible]	36	73	5.0	37	75	5.1	38	76	5.2	38	77	5.3	39	78
35	5.1	38	75	[illegible]	38	77	5.3	39	79	5.4	40	80	5.5	41	81
40	[illegible]	38	78	5.4	40	80	5.5	41	82	5.6	42	84	[illegible]	43	85
45	[illegible]	41	82	5.6	42	83	5.7	42	85	5.9	44	87	6.0	45	89
50	[illegible]	42	85	5.9	44	87	6.0	44	89	6.1	46	91	6.3	47	93
5½ GALLONS OF WATER PER BAG OF CEMENT															
30	4.8	35	72	4.9	36	74	5.0	37	75	5.1	38	76	5.2	39	78
35	5.0	37	74	5.1	38	76	5.2	39	78	5.3	39	79	5.4	41	80
40	5.2	38	77	5.3	39	78	5.4	40	80	5.5	41	82	5.6	42	84
45	[illegible]	40	80	5.7	41	82	5.7	42	84	5.8	43	86	5.9	44	87
50	5.6	41	84	5.8	43	86	[illegible]	44	87	6.0	45	90	6.2	46	92
6 GALLONS OF WATER PER BAG OF CEMENT															
[illegible]	[illegible]	36	71	4.9	36	72	[illegible]	[illegible]	[illegible]	5.0	37	75	[illegible]	38	76
35	[illegible]	37	74	[illegible]	37	75	5.1	38	76	[illegible]	39	78	5.3	40	79
40	[illegible]	38	[illegible]	[illegible]	39	77	5.4	40	79	5.4	40	81	5.6	41	82
45	5.3	40	[illegible]	5.4	41	81	5.6	41	83	5.7	42	84	5.8	43	86
50	[illegible]	41	85	[illegible]	42	84	5.8	[illegible]	86	[illegible]	44	88	6.1	45	90
6½ GALLONS OF WATER PER BAG OF CEMENT															
[illegible]	[illegible]	35	69	4.8	36	[illegible]	[illegible]	[illegible]	73	5.0	[illegible]	[illegible]	5.1	38	7[illegible]
35	4.9	36	72	5.0	37	[illegible]	5.1	38	75	5.2	38	76	[illegible]	39	78
40	[illegible]	38	75	[illegible]	38	76	5.3	39	78	5.3	39	[illegible]	[illegible]	40	8[illegible]
45	5.2	39	78	[illegible]	40	79	5.5	41	81	5.6	41	83	5.7	[illegible]	84
50	[illegible]	41	81	5.7	41	82	5.7	[illegible]	84	5.8	43	86	5.9	44	88

TABLE NO. 6 — 1:2:4½ Concrete

Voids in Coarse Aggregate per cent	VOIDS IN SAND, PER CENT 30			35			40			45			50		
	Cement Bags	Aggregate Cu Yd F	Aggregate Cu Yd C	Cement Bags	Aggregate Cu Yd F	Aggregate Cu Yd C	Cement Bags	Aggregate Cu Yd F	Aggregate Cu Yd C	Cement Bags	Aggregate Cu Yd F	Aggregate Cu Yd C	Cement Bags	Aggregate Cu Yd F	Aggregate Cu Yd C
5 GALLONS OF WATER PER BAG OF CEMENT															
30	[illegible]	34	75	[illegible]	35	[illegible]	4.8	[illegible]	80	4.9	36	81	5.[illegible]	37	83
35	4.8	36	80	4.9	36	8[illegible]	5.0	37	83	5.1	38	84	[illegible]	38	86
40	[illegible]	37	84	5.1	38	85	[illegible]	38	87	5.3	39	88	[illegible]	40	90
45	5.2	39	87	[illegible]	40	89	5.4	40	90	5.5	41	92	5.6	42	94
50	5.4	[illegible]	90	5.6	42	93	[illegible]	[illegible]	94	5.8	43	96	[illegible]	44	98
5½ GALLONS OF WATER PER BAG OF CEMENT															
30	4.5	34	76	4.6	[illegible]	77	[illegible]	35	79	[illegible]	37	79	4.[illegible]	6	[illegible]
35	4.7	35	79	4.8	36	[illegible]	[illegible]	36	82	[illegible]	[illegible]	81	5.1	38	83
40	4.9	37	83	5.0	37	8[illegible]	5.1	38	86	5.2	39	87	5.3	39	89
45	5.1	38	86	5.2	[illegible]	87	[illegible]	40	89	[illegible]	4[illegible]	91	5.6	41	93
50	[illegible]	40	89	[illegible]	1	2	6	1	[illegible]	[illegible]	[illegible]	95	5.8	43	97
6 GALLONS OF WATER PER BAG OF CEMENT															
0	4.5	33	75	4.6	3	76	4.7	[illegible]	78	4.7	35	78	4.8	[illegible]	80
35	4.7	35	78	4.8	35	80	[illegible]	36	81	4.9	37	82	[illegible]	37	84
40	[illegible]	36	81	5.0	37	83	5.1	38	84	5.1	38	86	[illegible]	39	87
45	[illegible]	37	84	[illegible]	38	86	5.3	39	88	5.4	4	89	5.5	40	91
50	5.3	39	88	5.4	1	90	5.5	41	[illegible]	5.6	41	[illegible]	[illegible]	42	95
6½ GALLONS OF WATER PER BAG OF CEMENT															
30	4.4	3	7	4.5	3	7[illegible]	[illegible]	[illegible]	77	[illegible]	3	77	4	35	79
[illegible]	4.6	34	[illegible]	[illegible]	35	78	8	36	83	9	36	81	1.9	36	82
40	8	36	8[illegible]	[illegible]	36	81	[illegible]	3[illegible]	82	[illegible]	38	84	5.1	38	86
45	5.0	37	8	5	38	87	2	38	86	5.3	39	88	5.4	40	90
50	5.2	38	8[illegible]	[illegible]	39	89	5.4	40	91	[illegible]	41	92	5.6	42	94
7 GALLONS OF WATER PER BAG OF CEMENT															
30	4.4	[illegible]	7	4.5	33	[illegible]	[illegible]	3[illegible]	76	[illegible]	3[illegible]	76	4.7	31	78
[illegible]	6	34	[illegible]	[illegible]	34	77	4.7	35	79	4.8	36	80	4.9	36	81
40	[illegible]	35	79	[illegible]	35	8	4.9	36	8	5.0	37	82	5.1	[illegible]	84
45	9	36	82	5.0	[illegible]	83	5.1	38	85	5.2	38	87	5.3	[illegible]	88
50	[illegible]	38	85	[illegible]	2	8[illegible]	[illegible]	2	89	[illegible]	[illegible]	91	5.6	41	93

[See also page 17 for further explanation on the use of these Tables]

(Continued on next page)

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

QUANTITIES OF MATERIALS PER CUBIC YARD OF CONCRETE

Mix by volume as used on job

Quantities in table expressed volumetrically as follows:—Bags of cement; Cubic Yards of Fine Aggregate (F), Cubic Yards of Coarse Aggregate (C)

Accuracy of tables depends on manner and care of determining voids in aggregates, voids must represent job conditions

Quantities are net, no allowance made for waste. If essential data are assumed correctly and there is no waste, quantities given in tables furnish the required volume or slightly greater if air is entrained.

Quantities for percentages of voids and proportions other than those shown in tables may be interpolated

Quantities of mixing water include moisture in aggregate.

The minimum quantity of mixing water shown in the table will produce a dry mixture, and the maximum quantity a wet mixture for average conditions

NOTE.—Bags of cement refer to paper bags of 1 cubic ft capacity or 24 to the ton

If cement is supplied in jute bags of 1 1/3 cubic ft. capacity or 18 to the ton, multiply the figures given under column "Cement Bags" by ¾ to obtain the number required

TABLE NO. 7 — 1 : 2½ : 4 Concrete

VOIDS IN SAND, PER CENT.

Voids in Coarse Aggregate per cent	30			35			40			45			50		
	Cement Bags	Aggregate Cu. Yd F	Aggregate Cu. Yd C	Cement Bags	Aggregate Cu. Yd F	Aggregate Cu. Yd C	Cement Bags	Aggregate Cu. Yd F	Aggregate Cu. Yd C	Cement Bags	Aggregate Cu. Yd F	Aggregate Cu. Yd C	Cement Bags	Aggregate Cu. Yd F	Aggregate Cu. Yd C
5 GALLONS OF WATER PER BAG OF CEMENT															
30	4.9	43	68	4.7	41	7[illegible]	4.8	45	71	4.9	46	73	5.0	47	75
35	4.8	41	71	4.9	45	7[illegible]	5.0	46	[illegible]	5.1	47	76	5.2	48	78
40	5.0	46	73	5.1	47	[illegible]	5.2	48	77	5.3	49	79	5.4	50	81
45	5.1	48	76	5.3	49	78	5.4	50	80	5.5	51	82	5.7	53	84
50	[illegible]	49	79	5.5	51	81	5.6	52	83	5.8	[illegible]	86	5.9	55	88
5½ GALLONS OF WATER PER BAG OF CEMENT															
30	4.5	.42	67	4.6	43	69	4.7	44	70	4.8	44	71	4.9	46	73
35	4.8	[illegible]	70	4.8	45	71	[illegible]	46	73	5.0	47	7[illegible]	5.1	48	76
40	4.9	46	73	5.0	46	74	5.1	47	76	5.2	48	77	5.4	50	79
45	5.1	47	75	5.2	48	77	5.3	49	78	5.4	[illegible]	80	5.6	52	83
50	5.3	49	78	5.4	50	80	5.5	51	82	5.7	52	81	5.8	54	86
6 GALLONS OF WATER PER BAG OF CEMENT															
30	4.5	.41	.66	4.6	.42	.68	4.7	.43	.70	4.8	.44	.71	4.9	.45	.72
35	4.7	43	69	4.8	.44	.71	4.9	.45	.72	5.0	.46	.74	5.1	47	.75
40	4.8	45	.72	4.9	45	.73	5.0	.47	75	5.1	48	76	5.3	49	78
45	5.0	.46	.74	5.1	.47	.76	5.2	.48	.77	5.3	49	.79	5.5	.51	.81
50	5.2	.48	.77	5.3	.49	.78	5.4	.50	81	5.6	.52	.82	5.7	53	.85
6½ GALLONS OF WATER PER BAG OF CEMENT															
30	4.4	.41	.66	4.5	42	.67	4.6	.43	.69	4.7	.44	70	4.8	45	71
35	4.6	.43	.68	4.7	.44	.70	4.8	.44	.71	4.9	.45	.73	5.0	46	74
40	4.8	.44	.71	4.8	.45	.72	5.0	.45	.74	5.1	.47	.75	5.2	48	77
45	4.9	.46	.73	5.0	.47	.75	5.1	48	77	5.3	.49	.78	5.4	50	80
50	5.1	.47	.76	5.2	.48	.77	5.3	49	80	5.5	51	81	5.6	52	83
7 GALLONS OF WATER PER BAG OF CEMENT															
30	4.3	.40	.65	4.5	.41	.66	4.6	42	68	4.7	43	69	4.8	44	71
35	4.5	.42	68	4.6	43	69	4.7	44	70	4.8	45	72	4.9	46	73
40	4.7	.44	.70	4.8	44	.71	4.9	45	72	5.0	[illegible]	74	5.1	48	76
45	4.8	.45	.72	5.0	.46	.74	5.0	47	75	5.2	48	77	5.3	49	79
50	5.0	.47	76	5.1	47	.76	5.3	49	78	5.4	50	79	5.5	51	82

(Continued on next page)

TABLE NO. 8 — 1 : 2½ : 5 Concrete

VOIDS IN SAND, PER CENT

Voids in Coarse Aggregate per cent	30			35			[illegible]			[illegible]			50		
	Cement Bags	Aggregate Cu. Yd F	Aggregate Cu. Yd C	Cement Bags	Aggregate Cu. Yd F	Aggregate Cu. Yd C	Cement Bags	Aggregate Cu. Yd F	Aggregate Cu. Yd C	Cement Bags	Aggregate Cu. Yd F	Aggregate Cu. Yd C	Cement Bags	Aggregate Cu. Yd F	Aggregate Cu. Yd C
5 GALLONS OF WATER PER BAG OF CEMENT															
[illegible]	4.1	38	[illegible]	[illegible]	39	78	4.3	40	79	[illegible]	40	81	4.7	41	83
35	4.3	[illegible]	79	4.4	[illegible]	81	4.5	41	83	4.6	2	8[illegible]	4.8	43	86
40	[illegible]	4	83	4.6	[illegible]	8[illegible]	4.6	43	86	4.8	4	88	[illegible]	45	90
45	4.6	[illegible]	86	4.8	[illegible]	88	4.9	45	90	5.0	46	[illegible]	1	47	94
50	4.9	5	91	[illegible]	46	[illegible]	1	47	94	5.2	48	97	5.[illegible]	49	99
5½ GALLONS OF WATER PER BAG OF CEMENT															
[illegible]	4.0	37	77	4.1	8	76	4.[illegible]	39	78	4.3	[illegible]	80	4.4	4	82
35	4.2	3	78	4.3	[illegible]	80	4.4	1	82	4.5	[illegible]	83	4.6	42	85
40	[illegible]	41	8[illegible]	5	42	83	4.6	3	85	4.7	43	87	4.8	44	89
45	[illegible]	4	87	4.7	43	89	4.8	44	89	4.9	5	91	5.0	46	93
50	8	4[illegible]	88	4.9	[illegible]	91	5.0	6	93	1	47	96	5.2	48	97
6 GALLONS OF WATER PER BAG OF CEMENT															
[illegible]	4.0	37	[illegible]	4.1	.38	76	4.2	39	[illegible]	4.3	0	80	[illegible]	40	81
35	4.2	[illegible]	78	[illegible]	40	79	4.4	40	81	4.4	41	83	4.5	42	84
40	4	[illegible]	8[illegible]	[illegible]	41	8[illegible]	4.5	42	84	4.6	43	86	[illegible]	44	88
45	4.6	42	84	4.6	43	86	4.7	44	88	4.8	5	90	[illegible]	46	91
50	4.7	43	87	4.8	45	89	4.9	46	92	5.1	47	94	5.2	48	96
6½ GALLONS OF WATER PER BAG OF CEMENT															
30	4.0	37	73	4.1	[illegible]	75	4.1	38	76	4.2	39	79	4.3	40	80
35	4.1	38	75	4.2	9	78	4.3	40	80	4.4	41	82	4.5	41	83
40	4.3	40	8[illegible]	[illegible]	41	81	4.5	41	83	4.6	42	84	4.7	43	87
45	5	41	83	6	4	85	4.7	43	86	4.8	44	88	4.9	45	90
50	[illegible]	1	85	[illegible]	44	88	[illegible]	4[illegible]	90	5	6	[illegible]	5.1	47	95
7 GALLONS OF WATER PER BAG OF CEMENT															
30	[illegible]	36	73	[illegible]	37	74	4.1	38	[illegible]	4.2	[illegible]	78	4.3	39	79
35	4.1	38	[illegible]	[illegible]	38	77	4.3	39	79	4.3	40	80	4.4	41	82
40	4.2	[illegible]	[illegible]	4.3	40	80	4.4	41	82	4.5	42	83	4.6	43	86
45	4.4	42	8[illegible]	5	2	83	4.6	2	85	4.7	43	87	4.8	45	89
50	4.6	42	84	4.7	43	86	4.8	[illegible]	89	4.9	45	[illegible]	[illegible]	47	94

[See also page 17 for further explanation on the use of these Tables]

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

QUANTITIES OF MATERIALS PER CUBIC YARD OF CONCRETE

Mix by volume as used on job.

Quantities in table expressed volumetrically as follows:—Bags of cement; Cubic Yards of Fine Aggregate (F), Cubic Yards of Coarse Aggregate (C)

Accuracy of tables depends on manner and care of determining voids in aggregates; voids must represent job conditions

Quantities are net no allowance made for waste. If essential data are assumed correctly and there is no waste, quantities given in tables furnish the required volume or slightly greater if air is entrained

Quantities for percentages of voids and proportions other than those shown in tables may be interpolated.

Quantities of mixing water include moisture in aggregate.

The minimum quantity of mixing water shown in the table will produce a dry mixture, and the maximum quantity a wet mixture for average conditions

NOTE.—Bags of cement refer to paper bags of 1 cubic ft. capacity or 24 to the ton

If cement is supplied in jute bags of 1 1/3 cubic ft. capacity or 18 to the ton, multiply the figures given under column "Cement Bags" by 4/3 to obtain the number required

TABLE NO. 9 — 1:3:5 Concrete

Voids in Coarse Aggregate per cent	VOIDS IN SAND, PER CENT. 30			35			40			45			50		
	Cement Bags	Aggregate Cu Yd. F	Aggregate Cu Yd. C	Cement Bags	Aggregate Cu Yd. F	Aggregate Cu Yd. C	Cement Bags	Aggregate Cu Yd. F	Aggregate Cu Yd. C	Cement Bags	Aggregate Cu Yd. F	Aggregate Cu Yd. C	Cement Bags	Aggregate Cu Yd. F	Aggregate Cu Yd. C
5 GALLONS OF WATER PER BAG OF CEMENT															
30	3.9	42	72	4.0	44	74	4.1	45	76	[illegible]	46	77	[illegible]	48	79
35	4.1	45	75	4.2	46	77	4.3	47	79	4.4	48	81	4.5	50	83
40	4.2	47	78	4.3	48	80	4.4	49	82	4.5	50	84	4.6	52	86
45	[illegible]	49	81	4.5	50	83	4.6	51	86	4.7	53	88	4.9	54	90
50	4.6	51	85	4.7	52	85	4.8	54	88	5	55	92	5.1	57	94
5½ GALLONS OF WATER PER BAG OF CEMENT															
30	3.9	45	74	4.0	44	76	4.0	45	75	4.1	46	76	[illegible]	47	78
35	4.0	44	74	4.1	46	76	4.2	47	78	4.3	48	80	4.4	49	82
40	4.1	46	75	4.2	47	79	4.4	49	81	4.5	50	83	4.6	51	85
45	4.3	48	80	[illegible]	50	82	4.6	51	85	4.7	52	87	4.8	53	89
50	4.5	50	84	4.6	51	86	4.7	53	88	4.8	54	90	5.0	56	93
6 GALLONS OF WATER PER BAG OF CEMENT															
30	3.8	42	71	3.9	[illegible]	[illegible]	4.0	44	74	4.1	45	76	4.2	46	77
35	4.0	44	73	4.1	47	75	4.2	46	77	4.3	47	79	4.3	48	81
40	4.1	46	76	4.2	47	78	4.3	48	80	4.4	49	82	4.5	50	84
45	4.3	48	79	4.4	49	81	4.5	50	84	4.6	52	86	4.7	53	88
50	4.5	50	83	4.6	51	85	4.7	52	87	4.8	53	89	[illegible]	55	91
6 GALLONS OF WATER PER BAG OF CEMENT															
30	3.8	42	70	3.9	43	72	4.0	44	73	4.1	45	75	4.2	46	76
35	4.0	44	73	4.1	45	75	4.1	46	76	4.2	47	78	4.3	48	80
40	4.1	45	75	4.2	46	77	4.3	47	78	4.4	[illegible]	[illegible]	4.5	50	83
45	4.2	47	78	4.3	48	80	4.4	49	82	4.6	51	86	4.7	52	86
50	[illegible]	[illegible]	[illegible]	4.5	50	83	4.6	51	85	4.8	53	88	[illegible]	54	90
7 GALLONS OF WATER PER BAG OF CEMENT															
30	3.8	42	70	3.8	42	71	3.9	43	73	4.0	44	74	4.1	46	76
35	[illegible]	[illegible]	72	4.0	44	73	4.1	45	75	4.1	46	76	4.2	47	79
40	4.0	45	74	4.1	46	76	4.2	47	78	4.3	48	80	4.4	49	82
45	4.2	46	77	4.3	47	79	4.4	49	82	4.5	50	84	4.6	51	85
50	4.4	48	81	4.4	49	82	4.5	51	84	4.7	52	87	4.8	54	89

TABLE NO. 10 — 1:3:6 Concrete

Voids in Coarse Aggregate per cent	VOIDS IN SAND, PER CENT 30			35			40			45			50		
	Cement Bags.	Aggregate Cu Yd F	Aggregate Cu Yd C	Cement Bags.	Aggregate Cu Yd F	Aggregate Cu Yd C	Cement Bags	Aggregate Cu Yd F	Aggregate Cu Yd C	Cement Bags	Aggregate Cu Yd F	Aggregate Cu Yd C	Cement Bags	Aggregate Cu Yd F	Aggregate Cu Yd C
5 GALLONS OF WATER PER BAG OF CEMENT															
30	3.6	35	76	3.6	[illegible]	81	[illegible]	41	82	[illegible]	[illegible]	84	3.9	43	86
35	[illegible]	41	.82	[illegible]	[illegible]	84	[illegible]	[illegible]	85	[illegible]	[illegible]	88	4.1	46	90
40	3.9	43	86	[illegible]	43	88	4.0	45	90	4.1	46	92	4.2	47	94
45	[illegible]	45	90	4.1	[illegible]	92	4.2	47	94	[illegible]	48	96	4.3	49	98
50	4.2	[illegible]	[illegible]	4.3	48	96	4.4	[illegible]	98	4.5	50	101	4.6	50	102
5½ GALLONS OF WATER PER BAG OF CEMENT															
30	[illegible]	[illegible]	8	3.6	40	80	3.7	41	81	3.7	[illegible]	82	[illegible]	[illegible]	8
[illegible]	[illegible]	41	81	[illegible]	[illegible]	82	3.8	43	83	3.9	[illegible]	[illegible]	[illegible]	43	85
40	[illegible]	43	85	[illegible]	45	87	[illegible]	44	88	4.1	[illegible]	[illegible]	[illegible]	46	92
[illegible]	4.0	44	89	4.1	45	[illegible]	[illegible]	46	[illegible]	4.2	47	93	[illegible]	48	[illegible]
50	[illegible]	46	[illegible]	[illegible]	47	[illegible]	[illegible]	48	97	[illegible]	[illegible]	[illegible]	[illegible]	50	102
6 GALLONS OF WATER PER BAG OF CEMENT															
[illegible]	[illegible]	39	[illegible]	[illegible]	[illegible]	[illegible]	3.6	40	80	3.7	[illegible]	82	[illegible]	[illegible]	8
35	3.6	[illegible]	80	3.7	1	8	[illegible]	[illegible]	81	3.8	1	83	[illegible]	1	85
40	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	86	[illegible]	4	87	[illegible]	[illegible]	90	[illegible]	46	91
[illegible]	[illegible]	1	87	1	47	8	[illegible]	[illegible]	90	[illegible]	[illegible]	3	[illegible]	48	96
50	[illegible]	46	[illegible]	[illegible]	48	[illegible]	4.1	48	[illegible]	4	5	8	[illegible]	9	10
6½ GALLONS OF WATER PER BAG OF CEMENT															
[illegible]	[illegible]	38	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	8	[illegible]	81	[illegible]	4.2	[illegible]	87
35	3.6	40	83	3.6	1	8	[illegible]	1	84	[illegible]	85	[illegible]	43	[illegible]	87
40	3.7	41	85	3.8	[illegible]	87	3.9	[illegible]	88	[illegible]	88	4.1	45	[illegible]	[illegible]
45	[illegible]	43	6	4.1	1	88	4.1	[illegible]	91	[illegible]	6	4.2	[illegible]	47	[illegible]
50	[illegible]	45	90	4.2	46	[illegible]	[illegible]	7	94	[illegible]	48	[illegible]	4.5	50	99
7 GALLONS OF WATER PER BAG OF CEMENT															
[illegible]	3.7	38	76	3.8	3	77	[illegible]	[illegible]	79	3.6	40	81	3.7	41	82
35	[illegible]	[illegible]	79	3.6	[illegible]	80	3.7	1	82	3.8	[illegible]	85	[illegible]	43	86
40	3.7	41	82	3.8	[illegible]	84	3.8	43	85	[illegible]	1	87	1	46	88
45	[illegible]	43	85	[illegible]	1	87	[illegible]	[illegible]	89	4.1	46	91	4	47	93
50	4.0	1	88	4.1	[illegible]	[illegible]	4.2	46	93	4.3	48	95	[illegible]	49	98

[See also page 17 for further explanation on the use of these Tables]

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HYDRATED LIME

DAVID MITCHELL ESTATE

HEAD OFFICE:
OLIVER'S LANE, OFF 142 FLINDERS ST., MELBOURNE

WORKS: LILYDALE, VICTORIA

3c

S.A.A. File No.

"Limil" is hydrated lime and is produced by the hydration of the famous Lilydale Lime, the process being so conducted that excess water is largely evaporated by the heat generated and results in the production of a physically dry fine powder from which all impurities of lime existing in the calcium oxide form are removed by air separation. An idea of its fineness may be gained from the fact that less than 1 per cent. residue is retained when it is passed through a standard 180 mesh sieve.

"Limil" is pure Lilydale lime in a newer and better form; it replaces the old form of lime for every constructional purpose. Its fineness also precludes any possibility of blowing, pitting or popping, and as "Limil" is in powder form an accurate gauge is always obtainable.

"Limil" is scientifically slaked at our hydrating unit; it offers among other advantages the fact that it is ready to be immediately incorporated with sand and water to form mortar, whereas ordinary lime must be allowed to season for days or weeks after being slaked, thus causing delay.

"Limil" can be stored indefinitely without deterioration or damage to the bags, and eliminates all fire risk and is available in paper-lined jute bags of convenient size.

"Limil" has the following well-defined uses in building construction:

1. As an admixture in concrete
2. For brickwork mortar
3. Plastering

"LIMIL" IN CONCRETE

There are numerous advantages which may easily be obtained through the use of "Limil" in concrete; they are as follows:

1. Improves Workability of the Mix

A considerable improvement in the workability of concrete may be secured by adding "Limil" to the mix. The admixture of Limil eliminates the danger of excess water and ensures an even mix which possesses that ease of workability which makes the concrete slide freely through the chutes and into the forms. It flows over and around reinforcing, conduits, and steel, completely covering and embedding all metal without the formation of water pockets, gaps or unfilled corners. This affords maximum protection against rusting of the steel and its attendant dangers. Upon removal of the forms the surfaces of the concrete will be found smooth and clean and the corners sharp.

2. Strength of Concrete is Increased

Laboratory tests have demonstrated that the strength of the concrete to which "Limil" has been added shows an improvement in the compression strength. (See table below.)

COMPRESSION TESTS ON "LIMIL"

(Conducted by the Testing Laboratory, University of Melbourne)

Mix 343

4 parts ¾in. bluestone screenings @ 88 lb./c. ft. = 0.592 c. ft.
1 part Kooweerup sand (11.8% bulking) @ 88 lb./c. ft. = 0.148 c. ft.
1 part Frankston sand (20.5% bulking) @ 91 lb./c. ft. = 0.148 c. ft.
1 part "Arc" brand cement @ 94 lb./c. ft. = 0.148 c. ft.

Water added	7.25 lbs.
Water in Kooweerup sand	0.47 lbs.
Water in Frankston sand	0.25 lbs.
Total	7.97 lbs.

Slump, 4 in.; Flow, 15¾ in.

BREAKING LOAD: LBS. PER SQ. IN.

	At 7 days.	28 days
	2150	3140
	2000	3520
Average	2075	3330

Mix 344

As 343, PLUS 10% "LIMIL" by weight of cement. Slump, 5½ in.; Flow, 16 in.

At 7 days.	28 days.
2960	4490
2970	4390
Av. 2965	4440

Mix 345

As 343, PLUS 10% "LIMIL," with 7% less mixing water. Slump, ½ in.; Flow, 14¾ in.

At 7 days.	28 days.
3310	5100
3410	5210
Av. 3360	5155

(Continued on next page)

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"LIMIL" IN CONCRETE

(Continued from Previous Page)

3. Making the Concrete Watertight

It makes the concrete watertight by filling the minute voids and pores which ordinarily exist The ultrafineness that makes it so efficacious as a void filler is not secured by grinding, as in the case of cement, but by normal physical characteristics acquired in the process of manufacture, and also by its own natural colloidal nature

4. The Colour of the Finished Concrete is Improved

The colour of the finished concrete is improved, the "Limil" tending to make it whiter, thus lending tone and colour to the structure and avoiding the dull monotonous gray which is so frequently found in unrendered structures If more than one brand of cement is used, the addition of 'Limil" will give a uniform colour and will disguise the varying colours of the different cements

5. Internal Stresses are Reduced

Internal stresses due to variation in the moisture content of the concrete are reduced. The "Limil" helps to stabilise the water content, keeping it more nearly constant, and thus greatly reduces the danger of damage to the finished structure from atmospheric conditions as well as from free water.

6. Segregation of the Aggregates is Avoided

Segregation of the aggregates is avoided by using "Limil." The fact that it reduces the amount of water required aids in accomplishing this end. The natural stickiness of the lime also assists in this function The final result is that the concrete is uniform and dense in character, free from stone pockets or similar blemishes and defects. Bridging in the forms or clogging in the chutes is reduced because the entire mass is uniform and mobile in character, rather than separated into its several constituents and fluid

Proportions and Recommendations

The proportioning and incorporation of "Limil" into the concrete mixture is simplicity itself. To each batch of the materials fed into the mixer is added the required amount of "Limil," and mixing is done in the usual manner

The quantity of "Limil" to be used depends largely on the nature and size of the aggregates, especially the sand With coarse uniform and clean sand a slightly larger quantity may be required, while with fine, well-graded sand a small quantity may be sufficient Likewise, large-sized hard and crushed stone will require a little more "Limil" than does well-graded gravel

To 1-2-3 concrete add 6 lb. of "Limil" for each 94 lb. bag of cement used (7 per cent).

To 1-2-4 concrete add 9 lb. of "Limil" for each 94 lb. bag of cement used (10 per cent.).

To 1-2½-5 concrete add 11 lb. of "Limil" for each 94 lb. bag of cement used (12 per cent.).

To 1-3-6 concrete add 14 lb. of "Limil" for each 94 lb bag of cement used (15 per cent.).

"LIMIL" IN BRICKWORK

The use of "Limil" in brickwork is highly desirable from many of the advantages set forth above. "Limil" in mortar works smooth and free It does not require constant tempering to bring it to a workable consistency, but always spreads easily under the trowel; brick or stone is fully bedded, which tends to increase the strength of the wall

"Limil" is recommended in brick mortar as follows:

(All gauges by volume)

1. For Straight "Limil" Mortar

3 parts of clean sharp sand to **1 of "Limil."** This mortar may be used immediately after mixing, but the best results are obtained if the mix is allowed to stand for 24 hours.

2. For Composite Mortar

9 parts of clean sharp sand to **2 "Limil"** to **1 of cement.**

This makes an excellent mortar for work where a stronger mortar than that produced by straight "Limil" is required. The average compression strength of the above mortar is 1,000 lbs. at 28 days

"LIMIL" IN BUILDINGS

A List of Representative Buildings in which "Limil" has been Used

Herald Buildings, Melbourne.
State Theatre Melbourne.
Taxation Offices, Melbourne
Institute of Anatomy Canberra.
Institute of Technology Canberra
Boiler House, S.E.C., Yallourn
S.E.C. Building Flinders Street, Melbourne
Titles Office, Melbourne
New Shell Building, William Street, Melbourne
Equity Trustees Building Melbourne
Collingwood Grandstand, Victoria
Port Authority Building, Melbourne
Swimming Baths at Preston, Footscray, Brunswick, Victoria and Canberra.
Kyabram and Koweerup, Victoria, Tanks.
Kodak Company, Melbourne, Tanks.
Footpaths at Kew, Box Hill and Moorabbin
Plaster Factory, South Melbourne
Paper Store, South Melbourne
Bathing Shelters, St. Kilda.
And others too numerous to mention

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B. R. C. FABRIC

THE AUSTRALIAN REINFORCED CONCRETE ENGINEERING COMPANY PTY. LTD.

Head Office: NORMANBY CHAMBERS, CHANCERY LANE, MELBOURNE

Works: SUNSHINE, VICTORIA, AND STRATHFIELD, N.S.W.

Agencies: SYDNEY, BRISBANE, ADELAIDE, PERTH, HOBART, NEW ZEALAND

4e

S A A File No

[For Other Products, See Index]

Products

B R C Electrically Cross-Welded Steel Wire Fabric for Floors, Roads and Slabs -B.R.C Systems of Reinforced Concrete Construction B R.C. Lintel, Beam and Column Reinforcing Units — B.R C Hoops, Helical Wrappings and Stirrups—B.R.C. Reinforcements for Standard Piles, for Bunkers, Silos, Bridges, Retaining Walls, Piers, Culverts, Sewers, Water Mains, Bathing Pools.

Manufacturing Plant

At Sunshine, Victoria, and at Strathfield, N.S.W., we have established up-to-date plants for the manufacture and fabrication of our Reinforcements from Australian Steel.

Description and Details of B.R.C. Fabric

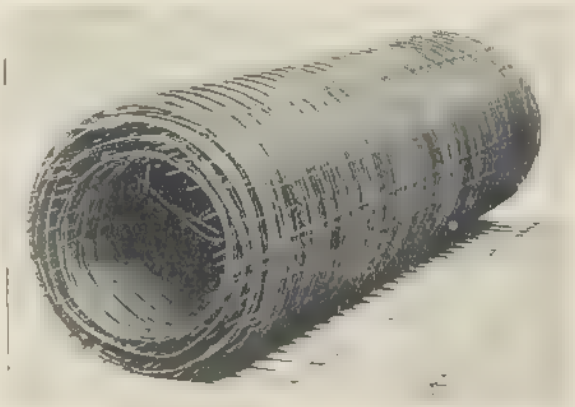
Material and Manufacture

B.R.C Electrically Cross-Welded Steel Wire Fabric is the ideal reinforcement for concrete slabs and surfaces. It consists of a wire mesh made up of a series of parallel longitudinal wires, held at fixed distances apart by means of transverse wires arranged at right angles to the longitudinal ones, being securely welded to them at the points of contact by a patented electrical process.

The wire used is best quality hard drawn mild steel

The longitudinal wires, which may be of any gauge, are automatically drawn from supply reels through a machine, which accurately spaces them at fixed distances apart. The progress of the longitudinal wires through the machines stops momentarily at definite intervals, whilst a single strand of transverse wire is placed across the longitudinal ones at right angles to their length At each point where the transverse wire crosses the longitudinals, there is then formed an electrical contact, which thoroughly fuses the metal of the two wires together.

The appearance of the finished product is illustrated in the accompanying photograph of a roll of B R.C. Fabric. In this view the unrolled portion of the fabric clearly shows the perfect alignment of the wires, and the efficient manner in which they are held in their proper relative positions.



A Roll of B R C. Fabric

Nature of Weld

If any two wires are cut through at their point of union, the character of the weld is most noticeable, revealing a perfectly smooth surface in which it is impossible to detect the slightest evidence of separation between the wires Even when seen through a microscope, this surface shows absolutely smooth and unbroken

In view of the fact that the transverse wires are not secured to the longitudinal ones by means of wire loops or clips, the casual observer is led to the conclusion that the wires are merely soldered together, or connected in some frail manner Such a conclusion is completely erroneous. The connection is made by an absolute and perfect weld, the two wires having been fused, and become actually homogeneous through the application of an electric current

Sample strands of B R C. Electrically Cross-Welded Steel Wire have been subjected to tests such as, tension until broken, and bending and twisting to complete distortion, yet never in hundreds of such tests has a wire broken directly at the weld. There is no doubt that the strength of the wire at the points of welding is greater than elsewhere

Spacing of Wires

Every strand of the wire entering into the construction of B.R.C. Fabric is, through its process of manufacture, properly placed with mechanical accuracy In this way is accomplished by machinery that essential element of construction, which in other types of reinforcing material is left in the hands of unskilled workmen after it has reached its destination.

B R C. Fabric is not shipped in a thousand and one separate parts, but in compact rolls, ready for installation as a perfect reinforcement made of the best grade of drawn steel wire, formed into a mesh

The purchaser obtains a reinforcement wherein all the work has been accomplished at the factory by skilled mechanics and perfected machinery. It reaches its destination in such a form that it may be easily, rapidly, and economically laid.

Advantages In Use

Strength of Steel Wire

Every inch of wire that is introduced into the construction of our Cross-Welded Fabric is rendered through its very process of manufacture a material of tested and determined strength. Close-fibred steel, drawn under considerable strain, is much stronger and more durable than either rolled steel bars or stamped sheets, which undoubtedly suffer much injury through cold cutting and distortion.

In this respect B.R.C Cross-Welded Fabric possesses an element of strength which cannot be claimed for the ordinary type of reinforcement. To further ensure reliability, every coil of wire is tested at our works, and is not utilised in our manufactures unless its tensile strength is equal to that on which our Tables are based

Rigidity

B R.C. Cross-Welded Fabric provides the greatest possible rigidity, owing to its having an absolute physical connection at each point of intersection, thus overcoming the great defect of all other systems of rod or wire mesh reinforcement. In these other systems such absolute connection is non-existent.

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Continuity of Reinforcement

B.R.C. Cross-Welded Fabric is laid in sheets up to seven feet in width, and of any length. There is thus obtained a complete sheet of reinforcing material extending from end to end of the structure, and giving throughout its entire length a perfectly unbroken reinforcement of drawn steel wire, providing one single continuous beam, far stronger than the large number of separate units usually employed

The transverse wires take up the transverse temperature stresses and distribute the "accidental" loads evenly over the longitudinal reinforcement.

Direct Action in Reinforcement

It is a well-established principle that any structure in sustaining certain loads is deformed by those loads in such a way that the total work done by the resisting stresses in the material is a minimum. The most efficient type of reinforcing material is the one capable of resisting all tensile stresses in the simplest and most direct manner Both theoretical and practical demonstrations show the fallacy of statements to the effect that a zig-zag, crimped, or indirect line of reinforcement, when embedded in the concrete, is as efficient as a direct line. It has been amply demonstrated that any irregularly-shaped mesh introduced into concrete, and placed close to the bottom of the slab, has a tendency to yield and shear or flake off the concrete on the underside, and to close up on deflection of the slab. B.R.C Cross-Welded Fabric reinforces efficiently on direct lines of tension, and maintains its original form when stressed.

Ease and Accuracy of Installation

The most important, and in many cases the most difficult, work in connection with the erection of reinforced concrete structures is the accurate placing of the steel. In order that a slab of concrete may safely sustain its superimposed load, it is not merely essential that it be provided with a certain amount of steel, but the steel, in order to do its duty, must be definitely located in the concrete

Carelessness in regard to this important feature has led to several failures in structures of reinforced concrete. The greatest care should always be exercised in placing reinforcement

Where single rods are used, or short sheets of reinforcement, a considerable expenditure of time and money is involved, as it is necessary to lay the pieces separately, to carefully space them, and then to fasten them in position. The correctness or otherwise of such positions is completely dependent on the man who is actually laying the reinforcement. The risk is eliminated by using B.R.C Cross-Welded Fabric. It comes to the work in rolls, and can be neatly stored in a small space until required, and when required can be easily laid The exact spacing of the wires is already established, and it is impossible for their relative position to become changed in the slightest degree either before or after laying.

Flexibility of Design

B.R.C. Cross-Welded Fabric is not, like many other forms of reinforcement, an intricate system that admits of only restricted usage It may be adapted to any type of construction, and in all cases provides a simple and efficient means of continuous reinforcement. It is commonly used in the construction of Foundations, Walls, Partitions, Slabs, Floors, Roofs, Bins, Tanks, Reservoirs, Sewers, Culverts, Bridges, Retaining Walls, Platforms, Pavements, Fireproofing of Steelwork, and flat or curved Concrete Surfaces of all kinds.

FRANCIS HOUSE, MELBOURNE
1929 R.V.I.A. Award for Street Architecture.
Architects—Messrs. Blackett and Forster.
Reinforced throughout on the B.R.C. System.

Guarantee Against Movement of the Welded Wire

Each point of intersection between longitudinal and transverse wires must develop at least one-half the full strength of the transverse wire before the bond securing the longitudinal and transverse wires shows any movement

This result cannot be obtained by means of secondary fasteners, clips, or crimping.

Sizes of B.R.C. Fabric

Type of Wire

The wire used is best quality mild steel. The tensile strength varies from 80,000 to 100,000 lbs. per square inch. The elastic limit averages 65,000 lbs. per square inch, and the safe working tensile strength may be taken at 25,000 lbs. per square inch.

Spacing of Longitudinal and Transverse Wires

Longitudinal wires may be spaced on centres of three inches and upwards in steps of three inches. Our standard spacings are three inches, six inches, and twelve inches.

Transverse wires may be spaced on centres of two inches and upwards, in steps of two inches. Our standard spacings are six inches, twelve inches, sixteen inches, and eighteen inches.

B.R.C. Systems of Reinforced Concrete Construction

The B.R.C. Systems cover the whole range of Reinforced Concrete Construction in the simplest and most complete manner. The special features of the systems provide a margin of safety much in excess of the figure allowed for in ordinary calculations

Engineering Department—Designing Services.

The services of our Engineering Department are at the disposal of our clients. A staff of able and experienced engineers are ready to prepare and submit designs for all classes of reinforced concrete work, in which case the full responsibility for the design is taken, provided the reinforcements are supplied by us and correctly placed according to our plans.

(Continued on next page)

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Partial List of Structures in which B.R.C. Fabric and Reinforcements are used

STRUCTURE	ARCHITECT OR ENGINEER
Government Insurance Offices, Brisbane	G. G. Hutton, Esq.
Terminal Wheat Elevators, Glebe Island, Sydney	John S. Metcalf Co. Ltd.
City Baths, Footscray, Victoria	A. E. McCausland, Esq. C.E.
Ford Motor Works, North Shore, Geelong, Vic.	Messrs. Fyvie & Stewart
Grandstand, Williamstown Racecourse, Vic.	Albion H. Walkley, Esq.
A.N.A. Building, Adelaide	L. Gregory Bruer
Railway Station, Adelaide	Messrs. Garlick & Jackman
Motor Assembling Works for General Motors, Birkenhead, S.A.	Messrs. David Williams & Son
The Economic Stores Ltd., Perth	Messrs. Hobbs, Smith & Forbes
Y.W.C.A. Hostel, Auckland, N.Z.	F. J. Hooper, Esq.
Head Office, Huddart Parker Ltd., Wellington, N.Z.	Messrs. Crichton, McKay & Haughton
State Electricity Commission Building, Flinders St., Melbourne	A. R. La Gerche (Chief Architect)
St. Vincent's Hospital, Melbourne	Stephenson & Meldrum
"Newspaper House," Perth	
"Newspaper House," Melbourne	Stephenson & Meldrum and H. W. & F. B. Tompkins
New Shell Building, Melbourne	A. & K. Henderson

Standard Sizes

The following tables give particulars of sizes, weights, strengths, and shipping dimensions of our standard Fabrics, which can always be supplied at short notice. **Standard sizes are the cheapest to buy and most quickly obtainable.**

TABLE I
PROPERTIES OF STANDARD SIZES

Reference No. of Fabric	Size of Mesh and of Wire: Distance centre to centre of Longitudinal Wires (ins.)	Distance centre to centre of Transverse Wires (ins.)	Gauge of Wire: Longitudinal (Imperial Standard)	Gauge of Wire: Transverse (Imperial Standard)	Sectional Area of each longitudinal wire (sq. ins.)	Tensile Strength: Breaking Strength of each longitud. wire (at 80,000 lbs. per sq. in.) (lbs.)	Tensile Strength: Safe Tensile Strength (at 25,000 lbs. per sq. in.) in lbs. per ft. width of fabric	Weight per Square Yard	Sizes and Weights of Fabric: Size of Sheet or Roll	Width of Standard Roll or Sheet (ins.)	Contents of Standard Roll or 5 Sheets (square yards)	Weight of Standard Roll or 5 Sheets (lbs.)	Shipping Dimensions: Contents of Bundle	Approx. Dimensions of Bundle: Length (ins.)	Dia. or Width (ins.)	Thickness (ins.)
1	3	16	4/0	4	.1257	10052	12600	16.34	17' 4"	84	87 4-9	1101	5 Sheets	210	36	3½
2	"	"	3/0	4	.1087	8694	10900	14.26	"	"	"	861		"	"	3⅜
3	"	"	2/0	6	.0951	7608	9500	12.29	"	"	"	828		"	"	3⅛
4	"	"	1/0	6	.0824	6595	8200	10.75	"	"	"	725		"	"	2⅞
5	"	"	1	6	.0707	5655	7100	9.31	"			628		"	"	2½
6	3	16	2	6	.0598	4785	5000	7.98	180'	84	140	1118	1 Roll	89	31	
7	"	"	3	6	.0499	3990	5000	6.77	"	"	"	948		"	28	
8	"	12	4	8	.0423	3381	4200	5.79	"	"	"	811		"	27	
9	"	"	5	8	.0353	2824	3500	4.93	240'	"	186⅔	921		"	27	
10	"	"	6	8	.0290	2316	2900	4.15	"	"	"	774		"	26½	
11	3	12	7	8	.0243	1946	2400	3.59	240'	84	186⅔	670	1 Roll	89	24½	
12	"	"	8	10	.0201	1608	2000	2.85	"	"	"	532		"	24	
13	"	"	9	10	.0163	1303	1600	2.39	"	"	"	446		"	22½	
14	"	"	10	10	[illegible]	1[illegible]0	1[illegible]0	1.97				368		"	21½	
610	6	6	10	10	.0128	1030	650	1.57	"	87	193⅓	309		90	26	
1210	12	12	10	10	.0128	1030	325	.78	"	"	"	160		"	20	
655	6	6	5	5	.0353	2824	1750	4.32	180'	84	140	605		"	32	
636	3	10	6	6	.0290	2316	2900	4.59	"	"	"	640		"	23	
98	9	10	8	8	.0201	1608	507	1.62	240'	84	186⅔	302		89	25	
658	6	6	8	8	[illegible]	1608	[illegible]	[illegible]	8	84	186⅔	146		90	29	
93	9	9	3/0	3/0	.1087	8694	10900	8.86	*	84	(*Made to order as required)					

(Continued on next page)

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LINTELS

Lintels

The most frequent use of Lintels is to carry brickwork over window and door openings Where a number of lintels occur in the same horizontal line with narrow intermediate supports, such lintels may be joined together to form a continuous girder. However, in the majority of cases they should be considered as being freely supported

There are various conditions of loading, as follows —

Condition 1.

"Lintel in the middle portion of wall, or one of a series of lintels"

For practical purposes allow for weight of brickwork of a height equal to one-half the span

Condition 2.

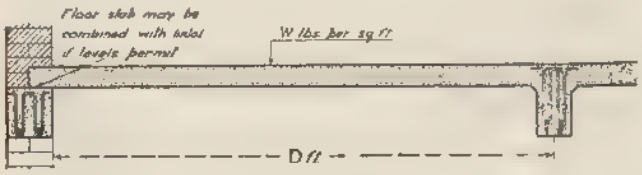
"One end of lintel close to end of wall."

Allow for weight of brickwork of a height equal to the full span, unless, of course, the actual height of brickwork over the lintel is less than this

Condition 3.

"Both ends of lintel close to end of wall," e.g., short wall

Allow for a weight of the full height of brickwork over the lintel.



Condition 4.

"Floor joists or slab resting on or over lintel."

Allow for the additional load from floor = $\frac{W\,D}{2}$ lbs per ft. run of lintel.

Where W = floor load (including weight of floor) in lbs. per sq. ft. of floor area,
D span of floor slab or joists in feet

TABLE 2

Weight of Brick Walls

Thickness of wall (ins.)	WEIGHT OF WALL Lbs. per ft. run — HEIGHT IN FEET									
					6		8		10	20
4½	[illegible]	[illegible]	[illegible]	[illegible]	270	315	[illegible]	[illegible]	450	[illegible]
9	180	270	360	450	540	630	720	810	900	1800
13½	270	405	540	675	810	945	1080	1215	1350	2700
18	360	540	720	900	1080	1260	1440	1620	1800	3600
22½	450	675	900	1125	1350	1575	1800	2025	2250	[illegible]

Condition 5.

"Roof rafters resting on lintel," or on brickwork above a lintel

Allow for an additional load per ft. run of lintel equal to L = 30 D.

Where L additional load in lbs. per ft. run.
D distance from wall to nearest purlin in ft

Other Conditions

Where a concentrated load, such as a roof truss or a main beam, rests on a lintel, the equivalent uniformly distributed load should be calculated and added to the other loads which are carried by the lintel.

Shape of Lintels

Lintels can be made without difficulty in any shape and the underside rebated to suit any type of window frame

Pre-Cast Lintels

When lintels are made on the ground in moulds the top side should be very distinctly marked, in order to avoid risk of subsequently handling or placing them wrong way up.

TABLE 3

Safe Loads in Lbs. per Foot Run of Lintel

Reference No.	Width of Beam (ins.)	Depth of Beam in Courses of Brickwork	No. of Bars	Diam. of Bars (Round) (ins.)	SPAN IN FEET 3	4	5	6	7	8	10	12	16	20
L11	4½	2	1	½	870	490	310	220	160	120	80			
L12		2	1	[illegible]	1030	58[illegible]	370	260	190	150	90			
L13		3	1	[illegible]	2100	1[illegible]	780	540	[illegible]	[illegible]	200	140		
L14		3	1	[illegible]	245[illegible]	138[illegible]	880	610	450	340	220	15[illegible]		
L15		4	1	[illegible]	4220	2380	152[illegible]	1060	780	590	380	260	150	
L16		4	1	[illegible]	6[illegible]	260[illegible]	16[illegible]	1150	850	650	420	290	160	
L21	9	2	2	[illegible]	1750	980	630	440	32[illegible]	250	160			
L22		2	2	[illegible]	1960	1100	710	490	360	280	180			
L23		3	2	[illegible]	3540	2440	1560	1080	8[illegible]0	61[illegible]	330	270		
L24	to	3	2	[illegible]	4850	27[illegible]4	1760	1220	9[illegible]0	69[illegible]	440	310		
L25	11	4	2	[illegible]	8460	4760	3040	2120	1550	1190	760	530	300	
L26		4	2	[illegible]		5190	3320	2310	1690	1290	830	580	320	
L27		5	2	[illegible]		7880	5040	3500	2570	1970	1260	880	490	32[illegible]
L28		5	2	1		8[illegible]20	5330	3700	2720	2080	1330	930	520	330
L31	13½	2	3	[illegible]	2570	145[illegible]	93[illegible]	64[illegible]	470	360	230			
L32		2	3	[illegible]	2[illegible]50	160[illegible]	[illegible]	7[illegible]	540	420	270			
L33		3	3	[illegible]	6480	3660	2340	162[illegible]	1190	910	580	410		
L34	11	3	3	[illegible]	73[illegible]0	41[illegible]	2[illegible]2[illegible]	[illegible]	13[illegible]	1030	660	460		
L35	to	4	3	[illegible]		7[illegible]	4520	3140	2300	1770	1130	730	44[illegible]	
L36	14	4	3	[illegible]		78[illegible]0	[illegible]	3170	2550	1950	1250	870	490	
L37		5	3	[illegible]			7[illegible]4[illegible]	5220	3840	2340	1880	1300	71[illegible]	470
L38		5	3	1			8000	5560	4090	3120	2000	1310	78[illegible]	500

Reinforced Brickwork

The difference in strength between plain brickwork and reinforced brickwork is as great as, if not greater than, that between plain and reinforced concrete.

A reinforced brick wall will withstand horizontal pressure from either side, such as that of wind or of material piled against the wall, and will also act as a vertical beam carrying its own weight from pier to pier.

B.R.C. Brick Wall Reinforcement consists of steel wire mesh, which lies flat and can be used without having to increase the thickness of the mortar joint. For 4½ in. walls the mesh consists of two strands of wire three inches apart with cross wires welded to them at intervals of 12 inches, for 9 in. walls, two strands of wire six inches apart, and cross wires at 12 in. intervals.

Walls should be built with cement mortar and the reinforcement is put in every fourth, third, or second course, or every course depending on the length of wall and whether it is an outside wall or partition wall

(Continued on next page)

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FLOOR SLABS

Design of Floors

In designing ordinary floors it is the custom to assume that the floor may have to carry a certain evenly distributed load, depending in amount on the purpose for which the floor is to be used. It is seldom that such evenly distributed loading actually does occur, except in the case of warehouse buildings, where goods are piled in a regular manner, but it is impossible to gauge exactly how a floor will be loaded, and the assumption of an evenly distributed load, sufficient to provide for unusual loads (such as, for instance, when a room in a dwelling-house or office building may become crowded with people) is a rational treatment, and at the same time simplifies the design.

In cases such as those floors required to carry heavy machinery, large safes, and the like, special designs are necessary.

Weight of Floor Itself

In addition to the superimposed loads it should be remembered that the weight of the floor itself must be taken into account. Reckoning the weight of reinforced concrete at 150 lbs. per cubic foot, allow 12½ lbs. for each ½-in thickness of floor, thus 4-in. slab = 50 lbs.

Floor Thickness

Where the thickness of floor is not already determined by other considerations, the most economical floor to adopt is that in which the concrete and the reinforcement are stressed in proportion to their respective strengths. (See Table 5.)

The thickness of the floor should not be less than one-thirtieth of the span.

Evenly Distributed Loads

The evenly distributed loads to be provided for, as mentioned above, are in certain cities specified by Local Building Authorities, and they vary somewhat. The following are typical:—

TABLE 4

Class of Building	Loads on Floor in Lbs. per Ft. Super			
	Melbourne (1923)	Sydney (1917)	Adelaide (1923)	London (1915)
Domestic Buildings	70	50	50	70
Office Buildings	84	60	60	100
Buildings for Public Assembly .	140	100	100	112
Workshop or Retail Shop . . .	140	100	100	112
Ordinary Warehouses	168	150	150	224
Flat Roofs	70	120	120	—

For continuation of this Table for Dead Loads, see page 31

TABLES

The following tables have been prepared for B.R.C. reinforcements. The formulae used in the calculations have been recommended in the Report of the Joint Committees on Reinforced Concrete.

The working stresses are as follows:—

	lbs. per square inch.
Concrete in compression in beams . .	600
Concrete in compression in columns .	600
Concrete in shear beams	65
Adhesion of concrete to steel	100
Steel rods and bars in tension	16,000
Steel wire in tension	20,000
Ratio of Co-efficient of Elasticity of steel to that of concrete	15

The concrete allowed for is composed of a 4—2—1 mix of broken stone, sand and cement.

TABLE 5

Concrete and Reinforcement Proportioned for Maximum Economy.

Floor Slabs. Continuous or with ends fixed. Reinforced with B.R.C. Fabric. The weight of the floor itself has been deducted, and no allowance is necessary in respect thereof.

For loads to the left of the heavy line, B.R.C. Stirrups must be used to resist Shearing Stresses. For Safe Loads on Slabs with ends "Freely Supported" take two thirds of above loads, and deduct one third weight of floor

Reference No. for Fabric	Thickness of Concrete (Ins.)	Approx. W'gt of Floor per sq. ft. (lbs.)	SAFE LOADS—UNIFORMLY DISTRIBUTED—LBS. PER FOOT SUPER. SPAN IN FEET											
			3	4	5	6	7	8	9	10	11	12	13	14
1	8½	106	6694	3714	2337	1594	1144	850	649	506	399	319	256	206
2	8½	106	6444	3584	2254	1534	1099	817	622	484	382	304	244	195
3	8½	106	5994	3274	2054	1394	994	737	550	434	340	269	214	167
4	8½	106	5694	3119	1976	1194	8[illegible]	6[illegible]	472	362	281	219	171	133
4	8	100	4820	2660	1670	1.29	8[illegible]	[illegible]	44[illegible]	[illegible]	2[illegible]	2[illegible]	162	126
5	7½	94	3856	2[illegible]	1396	8[illegible]	[illegible]	461	311	261	199	1[illegible]2	116	87
[illegible]	7	88	3502	1[illegible]	1202	81[illegible]	582	4[illegible]	[illegible]	[illegible]	1[illegible]	[illegible]	103	7[illegible]
[illegible]	6½	81	2779	[illegible]	[illegible]	631	441	321	[illegible]	[illegible]	131	[illegible]	71	[illegible]
[illegible]	[illegible]	[illegible]	2495	[illegible]	[illegible]	67	[illegible]	287	[illegible]	[illegible]	[illegible]	8[illegible]	62	41
[illegible]	5½	69	[illegible]	[illegible]	[illegible]	121	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
7	5	53	1057	901	[illegible]	[illegible]	253	[illegible]	[illegible]	92	65	44		
8	4½	56	1262	685	[illegible]	[illegible]	186	[illegible]	[illegible]	[illegible]	12			
9	4	50	830	473	[illegible]	[illegible]	[illegible]	81	[illegible]	[illegible]				
10	3½	44	612	[illegible]	[illegible]	[illegible]	77	[illegible]	[illegible]					
11	3	38	408	[illegible]	122	7	[illegible]	[illegible]						
	[illegible]	31	255	130	[illegible]	[illegible]	[illegible]							

(Continued on next page)

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Tables 6 to 12 (inclusive) are for Floor Slabs of 3 in., 3½ in., 4 in., 4½ in., 5 in., 5½ in., and 6 in. thickness respectively:—

Continuous, or with ends fixed. Reinforced with B R C. Fabric. The weight of the floor itself has been deducted, and no allowance is necessary in respect thereof.

For Safe Loads on Slabs with ends "Freely Supported" take two-thirds of above loads and deduct one-third weight of floor.

TABLE 6

CONCRETE 3 in. THICK

Reference No. for Fabric	Safe Loads—Uniformly Distributed—Lbs. per Ft. Super. SPAN IN FEET									
	3	4	5	6	7	8	9	10	11	12
1	842	457	278	182	124	86	60	41	28	
2	792	430	262	170	115	79	55	37		
3	762	412	250	162	109	75	51	34		
4	727	392	237	153	102	70	47	31		
5	692	372	225	145	96	65	43	28		
6	652	350	210	135	89	60	39	24		
7	612	327	196	125	82	53	34			
8	577	308	183	115	75	48	30			
9	530	282	166	104	66	52	25			
10	490	259	152	94	59	36				
11	408	212	123	73	44	25				
12	341	175	99	57	34					
13	273	137	74	40	19					
14	220	107	55	26						

TABLE 7

CONCRETE 3½ in. THICK

Reference No. for Fabric	Safe Loads—Uniformly Distributed—Lbs. per Ft. Super. SPAN IN FEET									
	3	4	5	6	7	8	9	10	11	12
1	1181	646	396	262	181	128	92	66	47	33
2	1126	616	378	249	171	121	86	61	43	29
3	1088	591	363	238	164	116	82	58	40	27
4	1026	564	346	226	155	108	76	53	36	
5	986	536	326	213	146	101	70	49	32	
6	926	501	304	198	134	92	64	43	28	
7	856	461	279	180	121	82	56	37		
8	804	432	261	168	111	75	50	32		
9	734	392	236	150	99	65	42	26		
10	612	326	192	120	77	49	29			
11	521	274	160	97	60	35	19			
12	431	222	127	75	43	23				
13	350	177	98	54	28					
14	268	132	68	34						

TABLE 8

CONCRETE 4 in. THICK

Reference No. for Fabric	Safe Loads—Uniformly Distributed—Lbs. per Ft. Super. SPAN IN FEET									
	4	5	6	7	8	9	10	11	12	13
1	884	535	356	249	179	131	96	71	52	37
2	825	510	339	236	160	123	90	66	47	33
3	790	489	324	225	160	116	85	61	43	30
4	750	464	308	212	150	109	78	56	39	
5	720	443	292	201	142	102	73	52	35	
6	675	407	268	184	129	91	64	44	29	
7	620	377	246	168	117	82	58	38		
8	570	346	225	152	105	72	49	32		
9	4[illegible]	385	182	121	81	53	34	19		
10	395	234	148	95	61	38	21			
11	331	194	119	74	45	25				
12	268	158	91	54	29					
13	212	118	66	35						
14	172	92	48							

TABLE 9

CONCRETE 4½ in. THICK

Reference No. for Fabric	Safe Loads—Uniformly Distributed—Lbs. per Ft. Super SPAN IN FEET									
	4	5	6	7	8	9	10	11	12	13
1	1114	692	464	326	236	175	131	99	74	54
2	1064	662	442	310	224	165	123	92	69	50
3	1022	634	424	290	213	157	116	86	64	46
4	955	593	394	275	198	144	106	78	56	40
5	856	559	371	258	186	134	98	71	51	35
6	833	512	339	234	164	119	86	61	43	28
7	789	485	322	220	156	111	79	56	38	
8	685	418	273	186	129	90	62	42	26	
9	556	336	216	144	97	65	42	25		
10	462	275	174	113	73	46	27			
11	387	228	141	89	56	31				
12	324	187	113	68	39					
13	272	154	89	51	26					
14	230	128	72	38						

TABLE 10

CONCRETE 5 in. THICK

Reference No. for Fabric	Safe Loads—Uniformly Distributed—Lbs. per Ft. Super. SPAN IN FEET									
	5	6	7	8	9	10	11	12	13	14
1	862	579	409	298	222	168	128	97	74	55
2	817	549	387	281	209	157	119	90	67	49
3	782	524	367	267	198	149	112	84	62	45
4	740	490	346	250	185	138	102	76	56	39
5	687	457	319	230	168	124	92	67	48	33
6	652	434	302	217	158	116	85	61	43	28
7	557	367	253	179	128	92	65	44	29	
8	469	307	209	145	101	70	47	29		
9	390	252	168	114	77	50	31			
10	32[illegible]	203	13[illegible]	87	55	33				
11	269	167	106	66	39	20				
12	216	121	79	46	23					
13	18[illegible]	113	6[illegible]	32						
14	129	70	35							

(Continued on next page)

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TABLE 11

CONCRETE 5½ in. THICK

Reference No. for Fabric	Safe Loads—Uniformly Distributed—Lbs. per Ft. Super. SPAN IN FEET									
	5	6	7	8	9	10	11	12	13	14
1	1036	701	496	363	273	207	159	123	95	72
2	991	671	473	346	259	197	151	116	88	67
3	939	631	446	325	242	183	139	106	80	60
4	886	594	417	303	225	169	128	96	72	52
5	831	556	391	283	209	156	117	87	64	46
6	754	503	351	253	185	137	101	74	53	36
7	636	421	291	206	138	107	76	53	35	21
8	539	353	241	168	118	83	56	36	21	
9	451	293	206	135	92	61	88	21		
10	356	233	162	101	65	39	21			
11	299	187	119	76	44	23				
12	256	157	97	58	31					
13	192	112	64	32						
14										

TABLE 12

CONCRETE 6 in. THICK

Reference No. for Fabric	Safe Loads—Uniformly Distributed—Lbs. per Ft. Super. SPAN IN FEET									
	5	6	7	8	9	10	11	12	13	14
1	1235	833	593	436	329	251	195	152	118	92
2	1165	786	558	410	308	235	181	140	105	83
3	1105	742	526	385	288	219	168	129	99	75
4	1035	695	490	358	267	202	154	117	89	66
5	980	659	465	338	248	189	143	109	81	60
6	860	567	399	287	211	156	116	85	62	41
7	705	466	323	230	166	120	86	60	40	24
8	599	393	269	185	133	93	64	42	25	
9	480	310	208	141	96	63	39	21		
10	401	255	168	111	72	44	23			
11	335	209	134	85	51	27				
12	295	181	114	69	39					
13	228	136	43							
14										

TABLE 13

STANDARD LOADINGS, OTHER CONDITIONS VARIED

70 lbs. per sq. ft. Span in Feet.						84 lbs. per sq. ft. Span in Feet.						112 lbs. per sq. ft. Span in Feet.						140 lbs. per sq. ft. Span in Feet.						168 lbs. per sq. ft. Span in Feet.					
Thickness, &c. Slab (ins)	6	7	8	10	12	Thickness, &c. Slab (ins)	6	7	8	10	12	Thickness, &c. Slab (ins)	6	7	8	10	12	Thickness, &c. Slab (ins)	6	7	8	10	12	Thickness, &c. Slab (ins)	6	7	8	10	12
	No.	No.	No.	No.	No.		No.	No.	No.	No.	No.		No.	No.	No.	No.	No.		No.	No.	No.	No.	No.		No.	No.	No.	No.	No.
3	10 9					3	8					3½	9 7					4½	11 10 8	9 8 6	4			4½	10 9 7	7 5			
3½	12 11 9	9 7				3½	11 10 9	8 7				4	11 10 8	8 6				5	11 10 9	9 8 7	8 7 5			5	11 9 8	9 7 6	6 4		
4	13 11 10	11 10 8	8 6				12 11 9	10 9 8	7 6			4½	11 10 9	10 9 7	7 6			5½	12 11 9	10 9 7	9 7 6	3		5½	11 10 9	9 8 7	8 6 6		
4½	13 13 11	11 10 9	10 9 7	4		4½	13 12 10	11 10 8	9 8 6			5	12 11 9	10 9 8	9 7 6			6	12 11 10	10 9 8	9 8 6	5 3		6	12 11 9	10 9 7	8 7 5	3	
5	13 13 11	12 11 9	10 9 7	6 5		5	13 12 11	11 10 9	10 9 7	6 4		5½	13 11 10	11 9 8	9 8 7	5 4		6½	12 13 10	11 10 8	9 8 6	6 5 4		6½	12 11 9	10 9 7	9 7 6	5 3	
5½	14 13 12	12 11 10	11 10 8	8 7 5	3	5½	13 13 11	12 11 9	11 9 8	8 6 5		6	13 12 10	11 10 9	10 8 7	7 6 4		7	12 12 10	11 10 9	10 9 7	7 6 4	1	[illegible]	12 12 10	11 9 8	9 8 6	6 5 3	
6	14 14 12	13 12 10	11 10 9	9 7 6	5 3	6	14 13 12	12 11 10	11 9 8	8 7 5	5 3	6½	13 12 11	12 10 9	10 8 7	7 6 5	2	7½	13 13 11	12 11 9	10 9 7	7 6 4	4 2	7½	13 12 10	11 10 8	9 8 7	7 5 4	1

Stresses Adopted

Concrete—600 lbs. per sq. in., for 1:2·4 mix.

Steel—Top Row—25,000 lbs. per sq. in.

Middle Row—25,000 lbs. per sq. in.

Bottom Row—16,000 lbs. per sq. in.

These tables have been calculated on $\frac{W.l.^2}{10}$ and fabric ⅝ in. from bottom of slab.

For end spans, take 1 ref. No. heavier.

For single spans, take 2 ref Nos. heavier

No allowance need be made for dead weight of slabs

For spans intermediate to those listed, take mean of reference numbers, for adjacent spans, next heavier ref. No. if fractional

Example

A single span floor 5 in. thick is required to carry 1 cwt added load on a span of 7 ft., using a stress of 25,000 lbs. per sq. in. on fabric. It is seen that No. 10 B.R.C. would be required if the slab were continuous at both ends. For an end span use No. 9 B.R.C., and for the present single span use No. 8 B.R.C.

(Continued on next page)

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BEAMS

Rectangular and T Beams

Reinforced concrete beams are, as a rule, either rectangular or "T" shaped.

Rectangular beams occur in the form of Crane Girders Wall Girders, Lintels and the like. They are extremely useful as heavy wall girders, the concrete forming portion of the wall.

"T" beams are used in all cases where a concrete surface is required to be supported by a beam. The flange on top of the "T" is formed by the concrete surface and the steel reinforcement is embedded near the bottom of a projecting concrete rib. The commonest case is that of a floor slab supported by beams at intervals. The concrete of the floor slab forms the compression flange and a monolithic construction is thereby obtained.

Design of T Beams

The design of "T" beams influenced by many conditions such as loading, span, beam spacing, etc., cannot be presented in detail by tables, as in the case of slabs.

Some index of determining the approximate size and shape of "T" beams is sometimes useful in the preliminary stages of design.

The following formula applies to "T" beams having loads uniformly distributed, and determines the cross sectional area only:—

$$\frac{W}{2} \times \frac{l}{90} = bd.$$

Where W = Total uniformly distributed load on the beam in lbs
bd. = cross sectional area of the beam in sq. ins
b = width of rib
d = depth of rib from top of slab to centre of steel.

The ratio of "b" to "d" should be as 1.1½ or 1·2½ unless governed by other conditions

Also "d" should not be less than 1-15th of the span and "b" not less than 6 ins.

e.g. W = 17,280 lbs
then $\frac{17280}{2} \times \frac{1}{90} = 96$ sq. ins
let b = 8 ins.
then d = 12 ins. plus 2 ins. for cover to reinforcement.

Approximate size = 14 ins. x 8 ins.

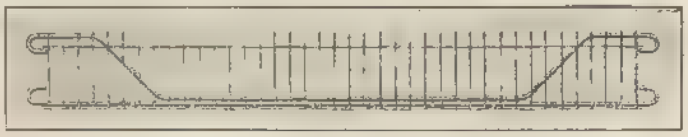
Specify all beams to be reinforced with B.R.C. standard units, which provide effective tension and shear reinforcement.

B.R.C. Standard Beam Units

Designed by our engineers to suit each particular set of conditions, B.R.C. Beam Units reduce error from the personal factor in reinforced concrete construction. Each unit consists of mild steel rods securely held in correct alignment and position by plain or grouped (fabric) stirrups with all rods bent, lapped and terminated at their correct positions.

Grouped or Fabric Stirrups

The provision of efficient resistance to shearing stresses is absolutely essential to the security of the beams. The B.R.C. system of Grouped Stirrups, besides being easier to manipulate and more rigid than any other, give a more intimate connection between the reinforcement and the concrete and a more regular and uniform distribution of stress.



B.R.C. Standard Beam Unit with Grouped Stirrups

It is less liable to be wrongly placed, less liable to displacement, and is a type that we have been able to standardise. The stirrup groups are standardised in lengths of 2 ft. each, so that on a bar, say 14 ft. long, there are seven stirrup groups, each one placed close up to the next.

B.R.C. Grouped Stirrups are made from B.R.C. Fabric, and the reference numbers in the stirrup table indicate the reference numbers of the Fabrics from which they are made

TABLE 4

(Continued from Page 28)

Dead Weights of Floors, Ceilings and Walls

	Weight in lbs per sq. ft.
FLOORS	
[illegible] in. Hardwood floor [illegible] 2 in. hardwood joists [illegible] 18 in. centres	6
Cinder concrete filling per inch of thickness	7
Cement finish per inch of thickness	12
CEILINGS	
Plaster on tile or concrete	5
Suspended metal lath and plaster	[illegible]
PARTITIONS	
3 in. Clay tile	[illegible]
4-in. Clay tile	18
6 in. Clay tile	[illegible]
3-in. Gypsum block	10
4 in. Gypsum block	[illegible]
5-in. Gypsum block	[illegible]
6 in. Gypsum block	16

For plaster partitions, add 5 lbs. per sq. foot of plaster area

TABLE 14

Strength of Standard B.R.C. Grouped Stirrups

Ref. No. of Stirrups	[illegible]	3	4	5	6	7	8	[illegible]	1[illegible]	1[illegible]	12	1[illegible]	14	15[illegible]
Area of cross section per ft. length (sq. ins.)	[illegible]	761	660	.566	479	400	338	282	232	[illegible]	[illegible]	.130	.103	[illegible]
Safe Working Tensile Strength of 1 Stirrup per ft. length (lbs.)	[illegible]	12200	10600	9100	7700	[illegible]	5400	4500	3700	3100	2600	2100	1650	400

(Continued on next page)

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COLUMNS

TABLE 15

COLUMNS—with ends fixed—centrally loaded. Reinforced with Round Steel Bars and B.R.C. Hoops and Helical Wrappings.
(not otherwise applicable.)

Reference No.	No. of Bars.	D (ins.)	d (ins.)	Diam. of Bars (ins.)	SAFE LOADS—TONS Length of Column (feet) 10	14	18	22	26	30
C41	4	10	7	⅝	17	16	14	12		
C42				¾	19	18	16	14		
C43				⅞	22	20	18	16		
C44	4	11	8	⅝	23	22	20	18	16	
C45				¾	26	24	22	20	18	
C46				1	28	26	24	22	20	
C47	4	12	9	⅝	28	26	24	22	20	
C48				¾	30	28	26	24	22	
C49				1	33	31	29	27	25	
C410	4	13	10	⅞	35	33	31	29	27	25
C411				1	38	36	34	32	30	28
C412				1⅛	41	39	37	35	33	31
C413	4	14	11	⅞	41	39	37	35	33	31
C414				1	44	42	40	38	36	34
C415				1⅛	47	45	43	41	39	37
C416	4	16	12	1	50	48	46	44	42	40
C417				1⅛	53	51	49	47	45	43
C418				1¼	57	55	53	51	49	47
C419	4	16	13	1	57	55	53	51	49	47
C420				1⅛	60	58	56	54	52	50
C421				1¼	63	61	59	57	55	53
C422	4	17	14	1	64	62	60	58	56	54
C423				1⅛	67	65	63	61	59	57
C424				1¼	70	68	66	64	62	60
C81	8	14	11	1	56	54	52	49	46	43
C82		15	12	1	62	60	57	54	51	48
C83		16	13	1	69	67	65	62	59	56
C84		17	14	1	78	78	75	72	69	66
C85		18	15	1	86	86	83	80	77	74
C86		19	16	1	95	95	93	90	87	83
C87		20	17	1	106	106	103	100	97	93
C88		21	18	1	116	116	116	116	110	104
C89		22	19	1	127	127	127	127	121	114
C810		23	[illegible]	1	138	138	138	138	[illegible]	125
C811		24	21	1	150	150	150	[illegible]	150	150
C812		25	22	1	161	161	161	161	161	161
C813		26	23	1	174	174	174	174	174	174
C814		27	24	1	188	188	188	188	188	188

For columns with one end free take ⅔ of the above loads. For columns with both ends free take 3-5ths of the above loads.

Columns

Reinforced Concrete Columns are more fire-resisting than columns of other materia. They are commonly square in section, but may be made rectangular, polygonal or circular, as required; corners of square columns may be bevelled

Reinforcement

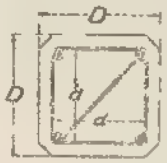
The concrete is reinforced with vertical rods encircled at intervals by wire hoops or ligatures and wrappings. The safe compressive load on the concrete is 600 lbs. per sq. in , and on the steel 9,000 lbs. per sq. in., the latter being always 15 times the former, owing to the relative elasticities of the materials.

The provision of efficient resistance to spreading of the bars and bulging of the concrete is absolutely essential to the security of the columns. Columns may have higher safe loads, depending on the mix of the concrete and the nature and amount of the wrapping

Hoops and Helical Wrappings

Hoops are used to encircle the bars and hold them in their correct position, ensuring that the core be of the proper shape and size.

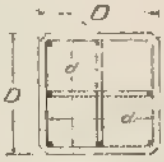
B.R.C. Helical Wrappings may be made for special shape or arrangement of bars Each wrapping is so designed that the top end is bent inwards to extend well across the concrete core, and the lower end is similarly dealt with.



For cross-section of Column refer to Column Table

When the column is complete the sections constitute one long helical wrapping from top to bottom. The pitch of the helical is determined by the load which the column is required to carry.

B.R.C. Hoops and Helicals are the most perfect form of binding.



For cross-section of Column refer to Column Table

Eccentric Loading

End columns are more heavily stressed than intermediate columns, the latter having a central load equal in amount whilst end columns have beams connected on one side only, which act more or less eccentrically It will be generally correct to design it as a column carrying a safe central load one-third greater than the above-mentioned eccentric load.

FOUNDATIONS

Reinforced Concrete Foundations

Reinforced concrete is well adapted to the construction of foundations As compared with plain concrete, its advantages for special footings are a reduction in the amount of excavation required a saving in material and a reduction in the weight of the foundation itself. It is suitable both for wall foundations and column foundation

Footing Reinforcements

The simplest form of reinforcement for wall footings is B R C mesh supplied in rolls cut slightly less than the width of footings. No. 9 fabric is recommended. Sheets of fabric can also be used in light column footings.

Heavy column footing reinforcement can be supplied by us and delivered to the job in the form of units or grids.

(Continued on next page)

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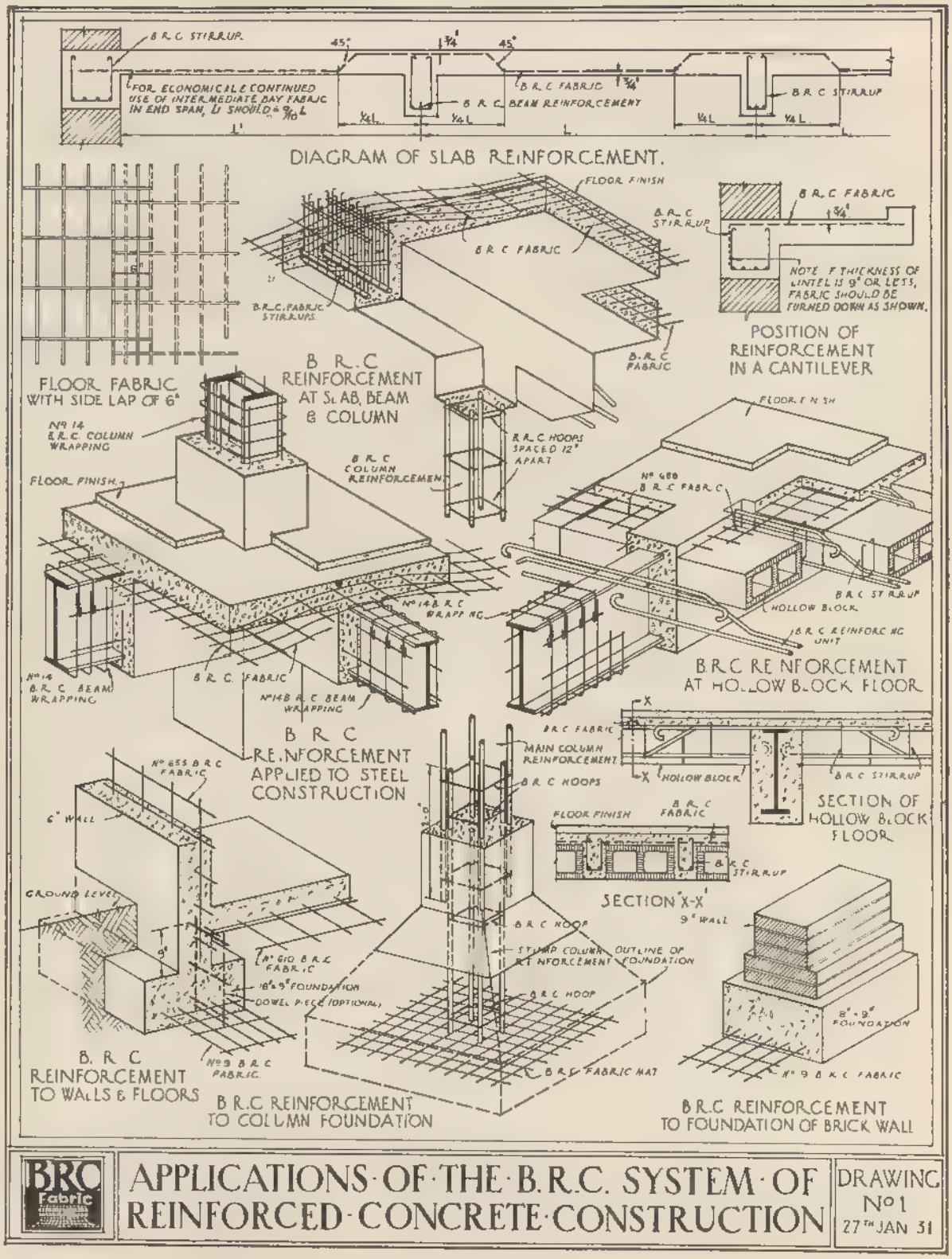

(Drawn by the Architectural Staff of Ramsay's Catalogue)

(Continued on next page)

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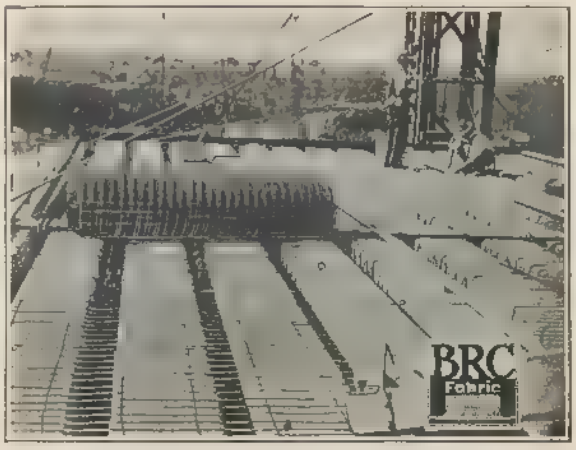
Hollow Block Floors

Hollow block construction is now used to a considerable extent in light buildings such as apartments and offices. The blocks may be either the one-way type or the two-way type. No cross beams are employed in the one-way type, except the small ribs of the floor slab formed between the rows of hollow blocks or tiles; in the two-way type, cross beams are placed at the columns. The blocks are placed directly upon the forms with the reinforcement in the spaces between them, and the concrete is filled in between the blocks and poured over the top to form the floor—the ribs thus form a series of comparatively light "T"-beams side by side with flanges (i.e., the floor thickness) usually 2 or more inches in thickness. B.R.C. reinforcing units used in this type of "T" beam, with B.R.C. electrically-welded mesh No. 688 manufactured especially for reinforcing the floor slab, ensures a highly satisfactory floor system of hollow block construction.



Hollow Block Floor Reinforced with B.R.C. Fabric
Adelaide Railway Station.

Wall Reinforcements

The two principal types of concrete wall construction are the "bearing wall" type, as in concrete residences and the "curtain wall" type, which is generally used to fill in the panels between the girder and column, which form the skeleton frame of the building.

In both cases reinforcement is a prime necessity, and in the latter type is universally demanded by the City Building Regulations. In most cases where curtain walls are employed with a small percentage of wider openings, it is customary to use both horizontal and vertical reinforcement. B.R.C. Fabric No. 655 provides ideal two-way reinforcement; an added feature when this reinforcing mesh is used is that the edges of window and door openings are stiffened by bending back the fabric into a U-shape.

External walls should not be less than 6 inches thick and internal walls may be 4 inches.

Beam and Column Wrappings

B.R.C. beam and column wrappings fabricated of No. 14 electrically-welded mesh have been extensively selected for use in fireproofing structural steel work.

When subject to fire the concrete protection to the steel work, unless properly protected and reinforced, will shatter and crumble off. Vibration is also liable to cause improperly reinforced supports of beams to crack.

The use of ordinary beam and column wrapping is unsatisfactory, for it does not reach out into the corners, which are the weakest parts. B.R.C. electrically-welded wrappings are pre-shaped to fit and stand out from the steel work, and may be confidently relied on to eliminate all possibility of slipping from position or coming apart when applied.

Piles

The advantages of reinforced concrete piles are many, absolute permanency, not being subject to decay or to the attacks of wood borers and destroyers; economy, because of greater carrying capacity, can be cut short or lengthened to suit the case after driving has commenced. The tops of B.R.C. piles are in no way damaged by being driven.

There are three standard shapes:—Square, octagonal and sheet piles. They are formed of rods encircled with B.R.C. Sectionised Helical Wrappings and hoops. They are made from 25 to 45 feet long and are fitted with cast iron or steel shoes.

Piles constructed with our B.R.C. reinforcements are stronger than any other form of reinforced concrete pile.

Recommended Sizes of B.R.C. Fabric Reinforcement

Position.	Reinforcement.
Wall foundations under brick or concrete walls	No. 9 B.R.C. fabric
Lintels	B.R.C. unit No. . (see Table 4).
Hearth slabs, 3 in. or 4 in. thick	No. 510 B.R.C. fabric (on filling)
Floor slabs 3 in. or 4 in. thick	No. 610 B.R.C. fabric (on natural ground) No. 655 B.R.C. fabric (on filled ground) No. B.R.C. fabric (for suspended floor) (See Table 6 et seq.)
Hollow block floor slab (min thickness 2 in.)	No. 688 B.R.C. fabric
Internal walls, 4 in. thick	No. 610 B.R.C. fabric (for small areas)
Internal or external walls, 6 in. thick	No. 655 B.R.C. fabric
Rectangular or T beams	B.R.C. standard units (with plain or grouped stirrups)
Structural steel fireproof wrappings	No. 14 B.R.C. fabric wrappings

Recommended Specifications for Architects' Use

1. For Domestic and Small Buildings

REINFORCEMENT

All reinforcements for lintels, beams, floors, slabs, walls and other reinforced concrete work shall consist of B.R.C. Standard Units and B.R.C. Electrically-welded Fabric, delivered on the job ready for placing in the forms or, in the case of fabric, cut to length (or in rolls) and in accordance with the following schedule:—

NOTE. Schedule should set out "Position" of member, Size" and "Reinforcement."

2. Reinforced Concrete Buildings (wholly or in part)

REINFORCEMENT

1. Materials and Fabrication

(a) Fabric.—All floor and wall reinforcing shall be B.R.C. Electrically-welded Steel Fabric of hard cold-drawn wire, conforming to the British Standard Specification for hard-drawn steel wire, and having an ultimate tensile strength of not less than 80,000 lbs., and an elastic limit of not less than 40,000 lbs., and shall be the gauges and sizes as set out in the Schedule (or, as shown on Drawings, Nos... .....).

(b) Reinforcing Units.—All beams and columns shall be fabricated of mild steel rods conforming to the British and Australian Standard Specification for Structural Steel. All reinforcements shall be delivered to the site in the form of shop fabricated B.R.C. units consisting of number and diameter of rods as set forth in the design, all bent and cogged to detail (as shown on Drawings, Nos.), and accurately spaced and securely held in position by means of B.R.C. plain (or fabric) stirrups secured to rods where necessary.

(c) Beam and Column Wrappings.—All structural steel members shall be wrapped for their entire length by No. 14 B.R.C. fabric wrapping.

(d) Identification.—All rolls, units and other miscellaneous pieces shall be labelled with strong tags wired on, marked to identify each piece and its position in the work.

2. Workmanship

(a) Cleanliness.—All reinforcing, when placed, shall be free from paint, oil or rust scale.

(b) Placing.—The contractor shall make a particular point of seeing that all parts of the reinforcement are placed correctly in every respect and are temporarily fixed where necessary to prevent displacement before or during the process of tamping and ramming the concrete into space.

(c) Mechanical Bond Overlaps.—All B.R.C. fabric shall be lapped from 3 in. to 6 in. at sides and about 40 diameters of the main wires at ends. At all intersections and laps in the fabric, mechanical bond shall be made by thoroughly lacing its fabric together by wiring.

(Continued on next page)

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ROADS AND PAVING

Road Reinforcement

B.R.C. Fabric has been largely used, and with great success, to strengthen the concrete roadways and to bridge over the weak spots in the under-bed below. The fabric, being supplied in long rolls of 240 feet, is very easy to lay.

For the heaviest traffic it is usually sufficient to have a thickness of six inches, reinforced with No. 9 B.R.C. Fabric.

For lighter traffic the thickness of concrete may be reduced to five inches, with a lighter gauge of reinforcement, No. 11 or No. 14 Fabric, depending on the class of traffic and the nature of the ground. In view of the changing nature of traffic it is in most cases advisable to anticipate the advent of heavier traffic.

B.R.C. Fabric provides a perfect road foundation, even on weak ground, because it spreads each wheel load over a very large area of the under-bed.

Edgeware Road, Marrickville, N.S.W.

Floor Paving

Three special sizes of B.R.C. Fabric are made for use in all classes of concrete floors or pavements laid directly on the ground, such as Office and Warehouse Basements, Workshop and Shed Floors, Platforms, Slopes and Embankments, Garages and Yards, Promenades and Footpaths.

Such floors laid without B.R.C. Fabric almost invariably crack, especially if laid on filling. Cracking may be due to contraction, expansion, unequal settlement, or unequal loading. If the floor is finished with a surface of granolithic, mosaic, asphalte, wood block, stone setts, or other form of paving, the cracking extends to such surface. In some cases it causes serious trouble; in all cases it is unsightly and objectionable. The liability to crack is considerably reduced, and, in most cases, cracking is entirely eliminated by using a layer of B.R.C. Fabric in the concrete.

At the same time the thickness of concrete may be reduced and the floor be more quickly laid. a thickness of 3 inches or 4 inches of concrete is generally sufficient, but more may be required on soft ground. B.R.C. Fabric, Ref. No. 655, is recommended where the floor is built on top of filling, or where the loads are heavy. Ref. No. 610 is recommended where there is no filling and where the subsoil is firm and floor loading is light. Ref. No. 688 is recommended for conditions of soil and loading intermediate between the above conditions or where a job is required slightly stronger than the No. 610 and less costly than the No. 655.

Notes on Construction, for Complete Reinforced Concrete Road

Six inches thick concrete reinforced with No. 9 B.R.C. Fabric will spread any wheel load over an area of at least 10 sq. ft. of ground.

A side slope of 1 in 50 gives an agreeable running surface.

Where filling is necessary, the ground should be filled in layers of about six inches. This gives the best results.

A light roller will often give sufficient consolidation where the reinforced construction is to be used.

Drainage is of the utmost importance. It should be obtained through side ditches at least 18 inches deep and filled up with rubble.

Concrete should consist by volume of

Four parts of good, hard, broken stone (1½in. to ¾in.),
One and a half parts of fine aggregate (¼in. down to sand)
One part of Portland cement.
Proportions are based on 40 per cent. voids.

Transverse joints are a source of weakness and are not required. Where work is left overnight it should be finished with a straight vertical edge across the road and an extra strip of reinforcement three feet wide should be inserted about two inches below the top of the concrete, half the width being built into the day's work, leaving 18 inches projecting to bond into the next day's work.

When a road is laid in two halves (to leave one side open for traffic) the longitudinal joint along the middle of the road should be finished against a board with a straight vertical edge, without any reinforcement projecting. The second half of the road should be finished tight up against the first half—any friable edges should be cut back to the solid.

Thoroughly soak the ground before laying the concrete.

Concrete should be mixed as dry as possible, so long as a workable mixture is obtained. Excess of water decreases the strength of the concrete.

The surface should be struck off with a wooden template. Finish, from a bridge across the road, with a wooden float. a metal float must not be used—smooth, plaster-like finish brings fine material to the top, which will flake off under traffic.

It is an advantage to squeeze the excess water out of the concrete by rolling. Use a hollow roller about 5 ft. long by 8 in. in diameter, made from sheet steel and weight about 80 lbs. Follow up with a rubber or canvas belt drawn across the surface of the concrete with a slight forward motion.

Protect finished concrete overnight with tarpaulin; next day cover with about two inches of sand or loam, kept wet for a fortnight. This is absolutely necessary to secure a good wearing surface. Leave for about three weeks before opening to traffic.

Notes on Reinforced Concrete Footpath Construction

Concrete should be two inches thick, reinforced with No. 14 B.R.C. Fabric, laid either longitudinally or transversely half an inch below the top of the concrete.

The ground to receive the concrete should be graded to the shape of the finished footpath.

Concrete should consist of three parts coarse aggregate, one and a half parts fine aggregate, and one part of cement.

Concrete should be first laid in small (3 ft. long) alternate sections—when set return and relay remaining sections.

A hard-wearing surface can be obtained by finishing and curing similar to reinforced concrete road construction.

Tennis Courts

Concrete tennis courts can be laid to give every satisfaction by laying about 4 inches of reinforced concrete on a layer of sand or clinkers after the subsoil has been properly prepared, drained graded and consolidated.

We recommend that the concrete be reinforced with either No. 610 B.R.C., or No. 13 B.R.C. fabric. In cases where a slightly heavier reinforcement is required, we recommend No. 688. The glare of the light on the concrete can be considerably relieved by incorporating suitable colouring pigments in the upper layer of the concrete.

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BLUESTONE
LIMESTONE
GRANITE
FREESTONE
MARBLE

STANDARD QUARRIES PTY. LTD.

WEARING STREET, FOOTSCRAY
VICTORIA

'Phone: Footscray 1111 (2 lines)

MASONRY CONTRACTORS QUARRY MASTERS

8

S.A.A. cite No.

Products and Quarries

The Standard Quarries Pty. Ltd. was founded some 40 years ago at Footscray, Victoria, and since that time has, under capable management, steadily grown until to-day the company owns and operates quarries as well as a modern masonry dressing plant located at Footscray, which is capable of efficiently handling and working all types of stone.

Our products range from crushed road metal and screenings to carefully executed statuary, in the manufacture of which bluestone, limestone, freestone, marble and granite, all from our own quarries, is employed.

Estimates—Samples—Service

Preliminary estimates will be gladly furnished on request of Architect or Contractor

Samples of any of our building stones will be furnished on request and advice as to grade or style of finish desired We shall be pleased at any time to confer with architects and place before them our knowledge on modern masonry This service is freely offered wherever it may assist in the logical and proper use of building stone, whether quarried by us or others, or help to solve the economic and aesthetic problems which may arise when the use of building stone is under consideration

The Port Authority Building for the Melbourne Harbour Trust Commissioners.

Architects
Sydney Smith, Ogg & Serpell

The exterior of this building—with the exception of the base—is constructed entirely of Stawell Stone

Builders
Hansen & Yuncken Pty. Ltd.

Stocks

Large stock of freestone blocks, also sawed slabs from 3 in. thickness up, are maintained at all times, assuring prompt delivery of finished work.

Economies

The modern method of quarrying employed in reducing waste and producing quarry stock of approximately true rectangularity, together with the modern cutting and finishing processes, most of which are accomplished by machine, reduces the hitherto high cost of the old hand methods

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DESCRIPTION AND PHYSICAL PROPERTIES OF COMMERCIAL BUILDING

Name of Stone	Colour and Grain	Description
STAWELL (FREESTONE)	Ivory — Deep Ivory — Variegated and exceptionally fine grained.	"Stawell stone has excellent weathering properties, as shown by its low absorption, great resistance to corrosion by carbon dioxide and to the action of mineral acids. It has very high crushing strength and chemically the stone is very stable and microscopically appears almost the ideal weathering sandstone." Henry C. Richards, M.Sc
RIPLSTONE (LIMESTONE)	Buff, with brown and cream relief. Uniform fine grain.	'Riplstone' is the name given to a sound limestone found in commercial quantities in the Western District of Victoria and quarried exclusively by Standard Quarries Pty. Ltd. It is a durable material with an even texture that offers a great resistance to the penetration of dirt; its weathering qualities are excellent and its soft light colour tones are permanent. Some splendid examples of early quarried stone and old exposed quarry ledges show even after forty years, sharp arrises and no sign of breaking or crumbling. No other commercial stone is so easily worked as "Riplstone"—it can be freely sawed, planed, turned or carved. 'On the whole, this stone is an excellent specimen of its particular type and stood the tests exceptionally well, particularly the compression test." H. B. Hauser M.Sc., Melb. Univ. "Stones with the best weathering properties are most resistant to compression. Compression tests value lies more in giving an indication of the adherence of the particles of stone and so measures the stone's durability, than whether it is strong enough."—Henry C. Richards, M.Sc.
STANDARD MARBLES	Light grey—dark grey. Light rouge—dark rouge. Mottled—Rainbow banded.	(See pages 50A and B).
GRANITES	Casterton red. Wangaratta pink and buff. Harcourt grey.	Granite has exceptional strength and durability, is practically non-absorbent, and indefinitely withstands exposure to climate and weather. It is available in a wide range of colours and texture and has infinite beauty and character, to be found in few other materials. It may be cut into any form desired, and dressed in a great variety of finishes. It takes a high and durable polish which will withstand long exposure to the weather
FOOTSCRAY BASALT (BLUESTONE)	Dark grey, compact and homogeneous.	Bluestone is a hard, dense basalt (dark grey in colour, with an open-textured face) and may be used for dimension stone. It is extensively quarried at Footscray, and in a crushed form is used for road metal, aggregate for concrete, etc.
SYDNEY FREESTONE	Yellow and of even texture	"A durable sandstone of even texture which turns yellow on exposure. Under the microscope a sample of this stone shows the grains to be clear and sharp, and the whole mass appears as bright and lustrous."—J. Nangle

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STONES AS QUARRIED AND SUPPLIED BY STANDARD QUARRIES

Uses.	Costs per sq. ft. unfixed (1933).	Physical Properties. Crushing load lbs. per sq. in.	Weight per cub. ft.	Absorption by bulk, per cent.	Loss by resistance to acids, per cent.	Remarks.
Office and Commercial Buildings. Banks and Public Buildings and all architectural exterior work. Lends itself readily to carving. Monuments, mausoleums, churches, chapels. Flooring, stairways, and dadoes.	Rock face . 6/- Rubbed face . 8/9	17,550	148	5.64	0.108	Authority for tests — Hy. C Richards, B.Sc.
All classes of buildings. Unsurpassed as a material for residential work either by itself or used to finish windows and doors, features, cornice bands and string courses in composite construction	Rippled face . 2/- Dragged face . 2/-	16,920	138	21.3	—	Composition, 95.7% pure Ca. CO_3. H. B. Hauser, M.Sc
(See pages 50A & B)	Polished . . 5/6	12,000 (approx.)	—	—	—	—
For permanent buildings of a monumental character. Base work in public and commercial buildings.	Rock face . . 10/- Exfoliated . . 11/6 Polished . . 18/-	14,900	168	0.39	—	—
	—	9,670	152.5	4.08		K McInerney.
	Rock face . . 8/3 Exfoliated . . 9/6 Axed faced 11/6 Polished . 17/6	11,444	167.5	0.11	—	K. McInerney.
Bridge and masonry construction. Door sills, stairways. Also where severe architectural treatment or a "heavy" style is desired	Rubble . . 2/- Axed or Shotted 4/9	8,620	162	2.16	-	K. McInerney
For buildings generally. Is well suited for moulded and carved work if of good quality.	Saw faced . . 7/3 Rock faced . . 7/3 Rubbed faced 8/- Claw toothed, faced . . . 8/3	7,366	144	8.40	1.031	Hy C Richards M Sc

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MODERN STONE CONSTRUCTION

In the design of the modern steel frame or reinforced concrete building, where the dead and live loads of the structure are carried independent of the facing materials, and where many simple devices are available for anchoring and carrying such facing materials, a new era in stone masonry is entered upon.

The day of solid stone buildings is past and stone becomes an embellishment rather than a feature of strength, though its beauty and texture can now be obtained at far less expense than previously; but, as in the past, good craftsmanship and careful selection of stone and wise setting out of constructional details are still very necessary

As stone does not in the modern building carry the weight and can be built as a facing long after the frame and concrete wall are in position, it alters many of the age-long customs and requirements of stone cutting and setting. It is not longer necessary that alternative course should bond in the wall, usually two bonding courses to each floor is all that is required (see plate, page 46, illustrating the construction of the A M P Building).

It is still necessary that the face bondings should be strictly adhered to, and the greatest difficulty lies at reveals and quoins in not showing the joint line of the thin facing stone. This is usually hidden by a member or feature and gives scope for the draughtsmanship of the architect. General typical examples of hiding this joint line are shown on the plate. One of the most costly operations in masonry is sunk and checked faces and backs, but by a little care the whole of these features can be obtained with straight slabs of stones and alternating joint and bed lines.

RECOMMENDED THICKNESS OF STONE FACINGS

NOTE.—The building regulations of Melbourne prescribing 4 inch thick as the minimum thickness of ashlars does not operate when outer walls are of the prescribed thickness.

The least thickness of facing stones recommended by us varies with the dressings on the face and the material used, thus:

Casterton or Harcourt Granite—

Polished faces	1½ in. thick
Shotted faces	1½ in. thick
Exfoliated faces	1½ in. thick
Rock face	6 in. thick

Stawell Freestone

Rubbed face	1½ in. thick
Sawn face	1½ in. thick
Rock face	6 in. thick

Sydney Freestone—

Rubbed face	3½ in. thick
Sawn face	3½ in. thick
Rock face	7 in. thick

Ripstone

Sawn face	3 in. thick
Rock face	4½ in. thick

Bluestone—

Rubbed face	3 in. thick
Sawn face	3 in. thick
Rock face	6 in. thick

MODERN STONE CUTTING AND DRESSING

Abrasive methods have largely replaced many of the hand operations of both Hardstones and Freestones; usually the same machines will dress both stones.

In the modern stone-cutting plant such as the Standard Quarries, the following and many other types of machines are available, thus making modern shop practice the means of producing high quality work at an economical rate.

Frame saws weighing about 10 tons are used for converting rough blocks of stone into slabs of required thickness Any required number of blades up to 30, about 14 ft. long, are fitted into the frame, which is moved back and forwards under pressure, and instead of using teeth, steel shot is poured under the blade with water, and the abrasive action thus set up cuts through the hardest granite. The Carborundum machines have wheels of carborundum of different diameter and thicknesses to suit varying requirements, and travel at a periphery speed of 7,000 ft. per min. With a strong stream of water playing on the cutting edge, the stones to be dressed are forced down under these wheels by a moving table, and faces, beds, joints and mouldings are cut as required, giving a beautiful rubbed finish to either granite, trachyte, bluestone, marble or freestone. Polishing machines have a radial arm jointed in the middle and are fitted with iron discs which travel under pressure at 280 r.p.m. Abrasives are fed under the discs with water to reduce the face to the required finish.

Stone lathes, which will turn columns, bases, caps, balusters, etc., from 16 ft. long to 3 ft. 6 in. diameter down to 12 in. long and 3 in. diameter, and somewhat resembling engineers' lathes, are used; they are much heavier, and the cutting edge of the tool is formed like a saucer, which revolves as it comes in contact with the stone. An engineer's lathe or tools will not cut such stones as granite.

Stone Finishes (see opposite plate)

Pickeo Face finish consists of a multitude of stabs with a hammer sharpened like a punch, and is used after the punch

Exfoliated Face is similar in appearance to Picked Face, but shows no tool marks, and is performed by subjecting the stone to a thin pencil point of heat. **This is a patented process of the Standard Quarries.**

Rock Faced Finish, as the name implies, is a natural finish; no labour is done to the face other than pitching it to a level line at beds and joints.

A Diamond-hammer finish is produced with a hammer with a number of pyramid points on each end, and gives a finer face than the "Pick"

A Vermiculated Finish (see plate), is made with drills, chisels and punches, and follows the single axe.

Polished Face is a process in granite or trachyte whereby all the surfaces are reduced to a very fine finish by the use of such abrasives as steel shot, carborundum grains, flour of emery, and is polished by oxides of tin, called putty powder, being rubbed on the face by heavy pressure felt.

All these finishes and preliminary labours are performed at the Standard Quarries by the use of compressed air-operated hand machine, drills and frame machines, operating pneumatic hammers, which strike 600 blows to a single blow made by the mason's hand. The tools used are a similar type to those used by the mason, but in the case of the punch, there are four and nine cutting points instead of the one By this feature and by reason of the greater rapidity of blows made by compressed air-operation, labour costs are greatly reduced.

Sandstone is dressed by hand up to the "axe" stage of the hardstones by a wooden mallet, instead of a steel hammer, using mallet headed chisels and punches.

Rubbed Face is a finish which is performed by rubbing out all tool marks with abrasives.

Batted Face is performed after the face is rubbed by striking a bladed chisel 3in. to 4in. wide with a light mallet. This finish is usually specified so many bats to the inch.

Tooled Face is somewhat similar to batted face, but the marks are more regular and deeper, and are usually specified "three bats to the inch"

Broached Face is a finish where a series of punched lines on parallel are sunk to the marginal drafts.

Limestones, such as Gamaru from New Zealand, Waurn Ponds, and Benara Limestones, are cut with saws and chisels somewhat similar to those used by a carpenter. The face is usually finished with the teeth marks of a small saw called a "Drag." Sometimes the face is left Rock faced

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THE STANDARD QUARRIES PTY LTD
WEARING STREET FOOTSCRAY MELB. VICTORIA.

Broaching is the term given to a stone face left from the tool

Chisel Drafted Margins

The marginal drafts are worked along four edges of stone - the centre being left rough or worked into various forms

Boasted Faces.

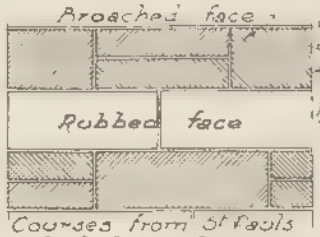
Are faces that show the tool marks and form of tool marks depends upon the style of the mason

Picked Work

The surface is chiselled true and is then picked over with a mallet and sharp point

Tooled Faces

The faces are such that are left with regular chisel marks across the surface of the stone with a batting tool When specifying tooling state number of lines or bats per inch



Courses from St Pauls Cathedral. Melbourne

Chisel drafted margins

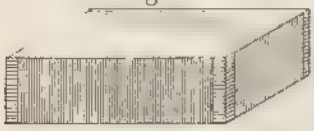
A fine example of broaching and rubbed work may be seen at St Pauls Cathedral Melbourne.

Broached courses in Barrabool Hills Freestone

Rubbed courses in Waurn Ponds Freestone

An example of Vermiculated work may be seen at the Houses of Parliament Melb the stone for the new Wing was carried out by The Standard Quarries Pty Ltd Wearing Street. Footscray

See the E.S.A. Bank Collins Street - Melbourne for an example of Picked Work

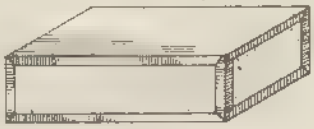


Tooled or batted

Claw Tooled

Vermiculated Quoin

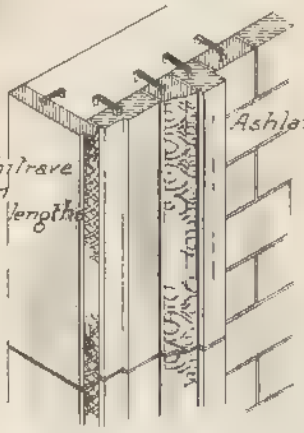
The stone has a series of sinkings, giving the stone a worm eaten appearance



Picked Quoin

Floting in Granite Architrave

Tooling cannot be done in granite



ENTRANCE DOORWAY

V.R.C BUILDING QUEEN ST MELBOURNE

Note the method used in forming reveal which is done in Red Gabo Polished Granite

NOTES FROM THE MELBOURNE CITY BUILDING REGULATIONS

Ashlar facing shall not be less than four inches thick and securely anchored or bonded to the backing of concrete or brick as the case may be, the thicknesses prescribed for walls shall be inclusive of facing provided such facing is constructed to bond in not less than half brick thicknesses.

Fire-resisting materials for general purposes include flagstones not being exposed on the underside and not being supported at the ends only. Granite or other stone suitable for building purposes by reason of its solidity and durability.

No stone piers shall exceed in height eight times the least dimension of same if built of lime mortar and twelve times if built of cement mortar.

The safe bearing load for brickwork and masonry shall be taken at eight tons per square foot when lime mortar is used and at thirteen tons per square foot when cement mortar is used. The safe bearing load for ashlar masonry shall be taken at eight tons per square foot when lime mortar and fifteen tons per square foot when cement mortar is used and in the case of granite or basalt twenty two tons per square foot

(NOTE.—The M.C.C. building by-laws now permit the use of a minimum of 1½ in thickness of stone for outside facings, provided that the material is suitable for such thin cut work.) **See pages 42 and 43 for complete details.**

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STONE FACINGS TO EXISTING BUILDINGS

Commercial Value of Modernised Buildings

In order to retain their present-day business status, professional, commercial, financial and industrial firms are now realising that they must be located in buildings of more modern appearance; also, many property owners of sound, well-constructed, but old-fashioned buildings are in great difficulties to secure an adequate income in competition with recently constructed buildings. Large organisations owning their own premises are in a somewhat similar position, as they are learning that their heavy looking old buildings do not assist in bringing the results gained by their competitors housed in buildings of really good appearance.

A deeper study of this phase of construction will show building owners that modernising their buildings is in some way essential to achieve the following:

1. To earn an income sufficient to pay maintenance and operating costs.
2. To pay an adequate rate of interest on capital invested
3. To stop immediately the drift of tenants
4. To attract tenants of other buildings
5. To place rentals on a higher plane
6. To increase the productive life of the buildings
7. To secure increased prestige.

How to Modernise

To modernise **without** wholesale demolition of good, sound buildings which are merely old fashioned looking and the erection, at great cost, of new structures, will be the building owners' problem, and for that reason he, naturally, will seek the advice of his architect. It is for the latter's assistance in preparing for his client a sound, **economical** and simple scheme of modernising existing buildings that we present the matter on these two pages showing the details of actual work carried out in accordance with local building regulations

Modernising existing buildings is not really so great an undertaking as it appears, and for the reasons already given, the cost involved invariably proves one of the soundest investments

Modernising of interiors is quite general; but, until recently, the complete conversion of the exterior was regarded as a huge undertaking. This is not so; it is, in many cases, a much simpler task than the conversion of the interior.

A typical American example of the conversion of an antiquated structure to a graceful and modern building

This remarkable change in appearance was caused by the use of stone facing, and illustrates the great possibilities of effecting similar transformations to some of our old fashioned looking buildings Stawell Stone, from every consideration of economy, adaptability, beauty and durability, is ideally suited for the purpose.

Stawell Stone — An Ideal Facing Stone

The M.C.C. building by-laws now permit the use of a minimum of 1½ ins thickness of stone for outside facings, provided that the material is suitable for such thin cut work. Due to its unique structural strength, Stawell Stone readily complies with these limitations. It can be simply and economically applied as a facing material to existing buildings Stawell Stone is a natural stone of ivory, deep ivory and variegated colouring (see description on page 38), lending itself to every detail of design It is durable to the highest degree, possessing excellent weathering properties as evidenced by its low absorption and great resistance to corrosion by carbon dioxide It retains permanently its character and finish, both in its plain surfaces and ornamental details.

METHOD OF CONSTRUCTION

In refacing an existing building with Stawell Stone, construction costs are very moderate, as in most cases it is not necessary to remove the old surface material. The facings (in effect stone tiles) are simply dowelled and cramped to the brick or concrete backing and a 4 in. ashlar bonding course built in at sill and lintel level These bonding courses carry the weight of the facings between (see drawing—section X-X and Y-Y); hence the work of facing any one story of the building could be carried out separately if so required

The isometric drawings show typical details of this method of stone facing applied to brick and concrete walls. The stones may be cramped to brick backing by removing a small portion of the brickwork at the points of fixing, inserting the cramps (A and B on drawing) grouting with cement and building in with brickwork. Alternatively, the stones may be cramped to the brickwork by using crimp cramps (similar to A1 and B1) inserted in the mortar joints and grouted with cement

Crimp cramps are invariably used for fixing to concrete. After the cramps have been inserted and grouted with cement, the crimped end insures a positive "grip" in the concrete and prevents any possible tendency of their pulling out. Similar crimped cramps are used to secure the soffit stones to concrete lintels (see details C and C1)

When it is necessary to remove cornices, bands, meaningless ornamentations, and to harmonise the existing door and window openings with the modern design of the refacing, these features are removed and the new surface of Stawell Stone built up and secured to the backing as before.

NEW BUILDINGS.—The application of Stawell Stone facings to buildings in the course of erection is, of course, more readily accomplished Constructional methods are similar to those previously described, except that the cramps are built into the structural backing as the work proceeds and left ready for the masons

SPECIFICATIONS.—The foregoing notes form a brief outline of the method of construction. As there is no major difference between this and ordinary methods of stone facing, the specification relating to stonework on page 47 may be accepted as a guide for the preparation of the more detailed items in a specification for Stone Facing Construction

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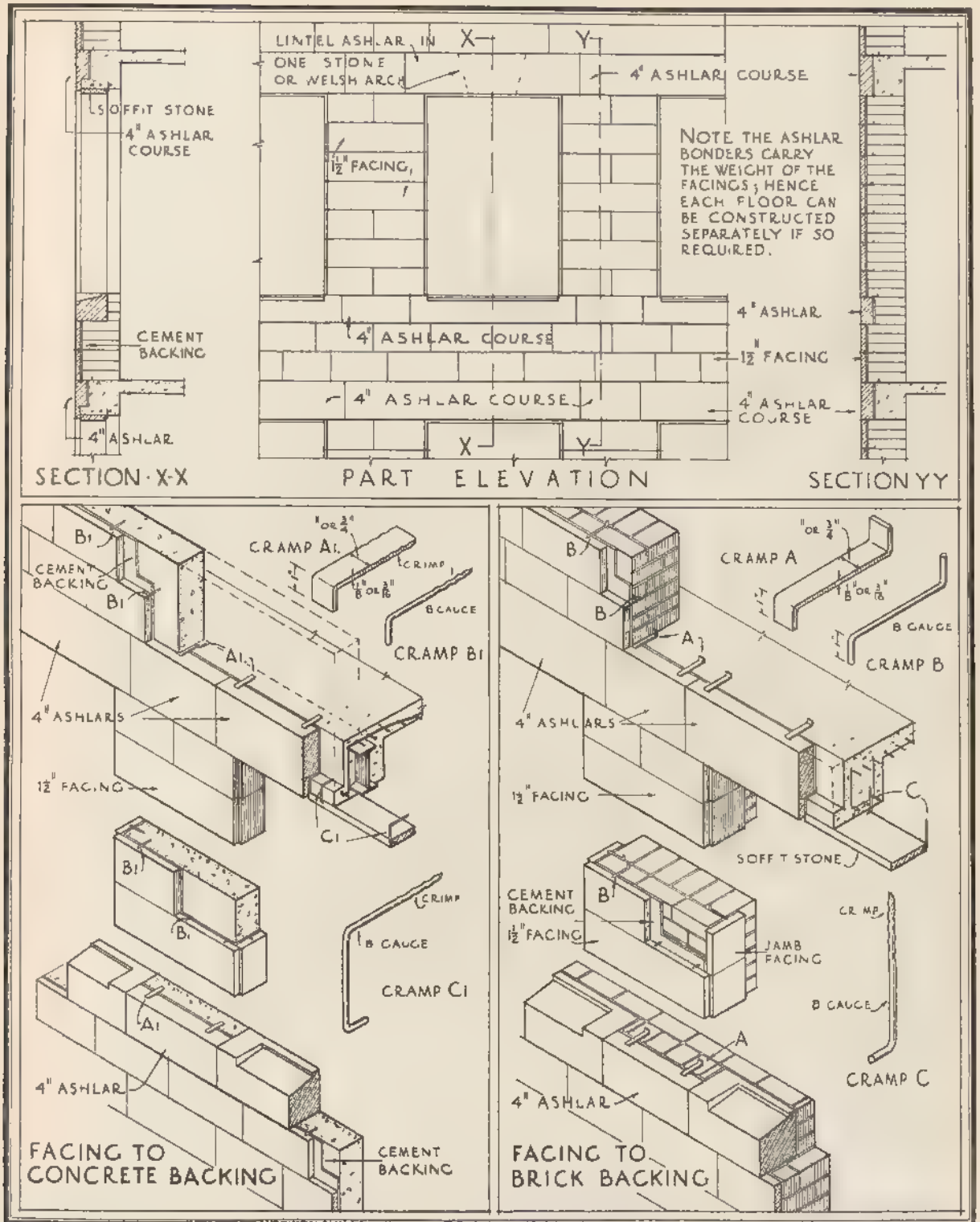

STANDARD QUARRIES

· TYPICAL · DETAILS · OF ·
· STAWELL · STONE · FACINGS ·

FOOTSCRAY VICTORIA

(Continued on next page

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DESCRIPTION OF STONEWORK AS SEEN IN MELBOURNE BUILDINGS

BUILDING	POSITION	MATERIAL BASE	FINISH	MATERIALS SUPERSTRUCTURE	FINISH
A.M.P.	Collins & Market Sts.	Castlemaine Red Granite	Exfoliated	Sydney Freestone	Rubbed Sawn, Clawed
Assembly Hall	Collins St.	Bluestone	Rubbed	Barraboo Hills Rubble Sydney Dressings	Rock, Rubbed
Bank of Australasia	Collins & Queen Sts.	Malmsbury	Tooled Margin, Axed	Oamaru Limestone	Dragged
Bank of N.S.W	Collins St.	Bluestone		White Tasmanian Freestone	Rubbed
Collins House	Collins St	Trachyte	Polished	Wangaratta Granite	Rock-faced, Axed
City Court House	Russell St.			Moorabool Freestone Geelong	Rock faced and Rubbed
Commonwealth Bank	Collins St	Orbost Granite	Polished	Trachyte Cols., Sydney Freestone	Polished, Rubbed
E.S. & A. Buildings Original	Collins & Queen Sts.	Bluestone		Sydney Freestone	Rubbed and Diamond Hammered
Old Stock Exchange	Collins St.	Bluestone		Sydney Freestone	Rubbed
Equitable Buildings					
Colonial Mutual Buildings	Collins St.	Phillip Island Granite	Polished	Harcourt Granite Phillip Island Cols.	Polished and Picked Polished
Flinders St Railway Station	Flinders St.	Bluestone Harcourt Granite	Picked, Axed Polished		
Flinders Way	Flinders Lane	Dandenong Granite	Polished	Stawell Coloured	Rubbed
Harbour Trust Buildings	Market St. & Flinders L.	Harcourt Granite	Polished	Stawell Freestone	Rubbed
Law Courts					
Original	William & Lonsdale Sts	Malmsbury	Rubbed	Tasmanian Freestone	Rubbed
New Block	Lonsdale St	Malmsbury	Rubbed	Stawell	Rubbed
McEwan House	Little Collins St.	Trachyte	Polished		
McIlwraith, McEacharn	William St.	Malmsbury Bluestone	Rubbed	Sydney Freestone	Rubbed
National Bank	Collins St.	Harcourt Granite	Axed, Polished Columns	Hawkesbury River Freestone	Rubbed
National Mutual Insurance	Collins & Queen Sts.	Harcourt Granite	Picked Panels and Polished Faces	Sydney Freestone	Rubbed
Northern Assurance Co	Collins St	Bluestone	Rubbed	Stawell	Rubbed
Parliament House—					
Original; Back	Rear of Spring St.	Bluestone	Rock-faced and Tooled	Bacchus Marsh Freestone	Rubbed
Front and Sides	Spring St	Bluestone	Diamond Hammered and Tooled Margin	Stawell Freestone	Rubbed
Post Office					
Original	Elizabeth & Bourke Sts	Gabo Island Granite	Rock-faced and Margins	Tasmanian Freestone	Rubbed
New Block	Elizabeth St.	Gabo Island Granite	Rock-faced and Margins	Stawell Freestone	Rubbed
Public Library—					
Original	Swanston St	Malmsbury	Rubbed	Tasmanian White Freestone	Rubbed
South Annexe	Swanston St	Malmsbury	Rubbed	Stawell, White Freestone	Rubbed
Extension	Russell & Lonsdale Sts.	Bluestone	Rubbed	Stawell Freestone	Rubbed
Queensland Insurance	William St	Bluestone	Rock	Sydney Freestone	Rock faced Rubbed, Boasted
Queensland National Bank	Collins St	Trachyte	Rock-faced, Axed, Polished		
Sargent's Buildings	Collins St	Bluestone	Axed	Stawell	Rubbed
Southern Insurance Co.	Collins St	Bluestone	Axed	Stawell	Rubbed
St. Patrick's Cathedral	Eastern Hill	Bluestone	Rock faced	Bluestone Tasmanian Freestone Dressing	Rock-faced Rubbed
St. Paul's Cathedral	Swanston & Flinders St.	Bluestone and Sydney Freestone	Rubbed	Barraboo Hills Ashlar, Waurn Ponds Dressing, Inside— Malmsbury Bluestone Sydney Freestone	Broached Rubbed Rubbed Rubbed
State Savings Bank — Head Office	Elizabeth St.	Harcourt	Polished	Stawell	Rubbed
T. & G. Buildings	Collins St. & Collins Pl.	Harcourt Granite	Polished, Axed, Slotted		
Taxation Offices	Lonsdale St.	Harcourt Base	Slotted and Polished	Stawell Freestone	Rubbed
Town Hall—					
Original	Collins & Swanston Sts.	Bluestone	Rock faced Tooled Margins	Tasmanian Freestone	Rubbed
Administration Block	Collins & Swanston Sts	Bluestone	Rock-faced, Tooled Margins	Stawell Freestone	Rubbed
New Annexe	Collins & Swanston Sts.	Bluestone	Rock-faced, Tooled Margins	Stawell Freestone	Rubbed
Treasury Buildings	Spring St.	Bluestone	Patent Axed	Bacchus Marsh	Rubbed Note—Being restored with Stawell Stone
University—					
Ormond College	Parkville	Bluestone		Barraboo Hills Ashlar Waurn Ponds Dressings	Rock faced Rubbed
Queen's College	Parkville	Bluestone		Waurn Ponds Freestone	Rubbed
Newman College	Parkville	Barraboo Hills	Rock-faced and Rubbed	Barraboo Hills	Rock-faced and Rubbed
Wilson Hall	Parkville	Malmsbury	Rubbed	Hunter Hills Sydney	Rubbed
Arts Buildings	Parkville	Bluestone	Rock	Redesdale Freestone	Rubbed
V.R.C. Building	Queen St.	Harcourt Granite	Slotted	Red Gabo Granite Doorway	Polished
Newspaper House	Collins St	Dromana Granite	Polished	Stawell plain and variegated	Rubbed

Note Boldface type indicates that stone was supplied and, in certain cases, supplied and dressed by Standard Quarries.

STONE PAVING AND WALLINGS

One of the latest developments in stone paving and wallings in buildings is the use of veined, coloured Stawell stone. It is composed of granitic sand, and the crushing strength exceeds that of Harcourt Granite by 53 per cent. Outstanding characteristics of this sandstone are its great resistance to wear, and its provision for non-slipping foothold. Its colouring does not permit the appearance of dust and dirt stains

Numerous tests were applied before this stone was selected as the flagging for the main chamber of the new A.M.P. Building, and for the dado and stairways of the new Equity Trustees Building. It is also specified for the Electricity Commission's new building in Flinders Street

(Continued on next page)

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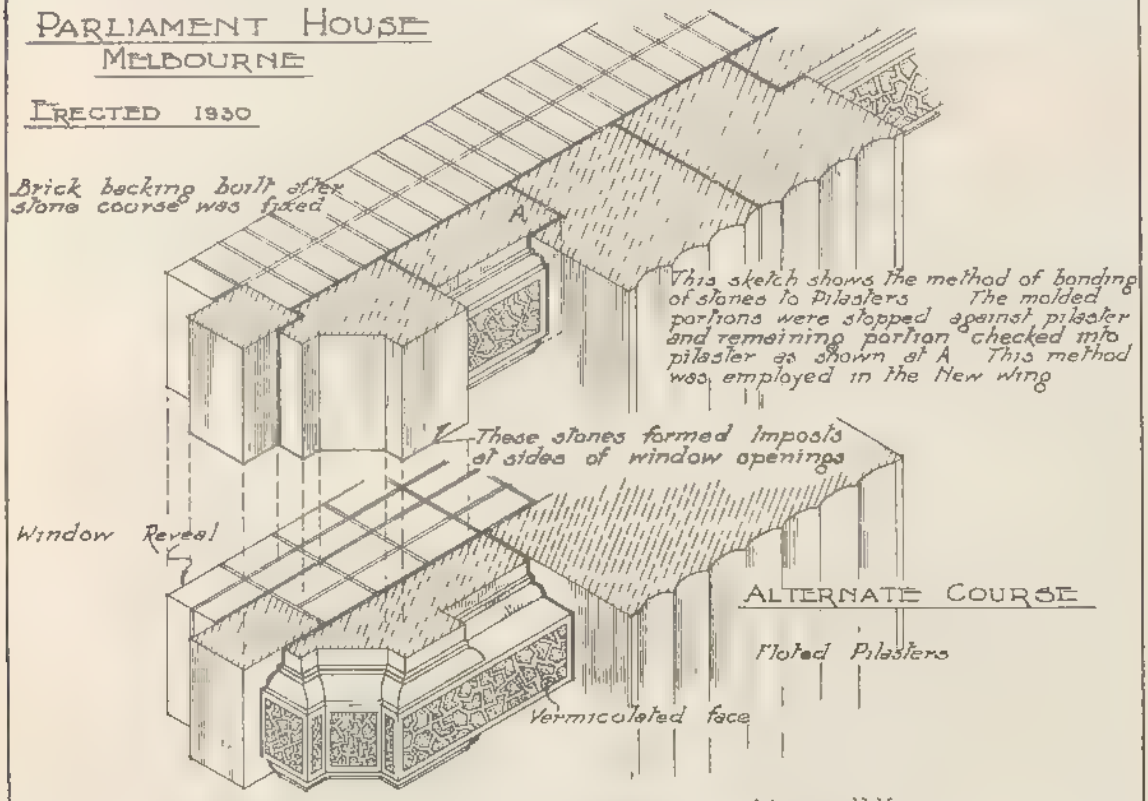
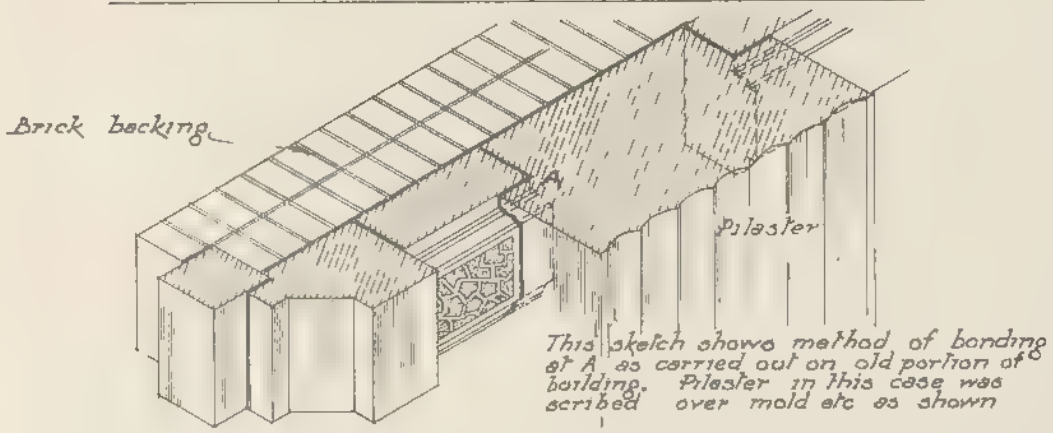
WINDOW REVEAL STONE BONDING *Alternate courses*

PARLIAMENT HOUSE MELBOURNE

ERECTED 1930



BONDING AS CONSTRUCTED IN NEW WING



BONDING AS CONSTRUCTED IN OLD PORTION

THE STONEWORK FOR THE NEW WING WAS CARRIED OUT BY

STANDARD QUARRIES PTY. LTD.

The stone used in the construction of the New Wing at Parliament House Melbourne, known as Stawell Stone was obtained from the Quarries of the Standard Quarries Pty Ltd The Quarries are situated in the Grampians and about 16 miles from Stawell

(Continued on next page)

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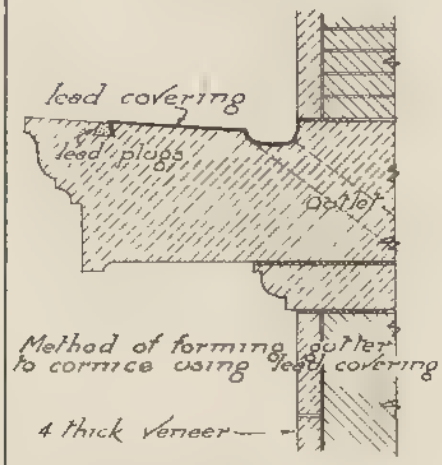
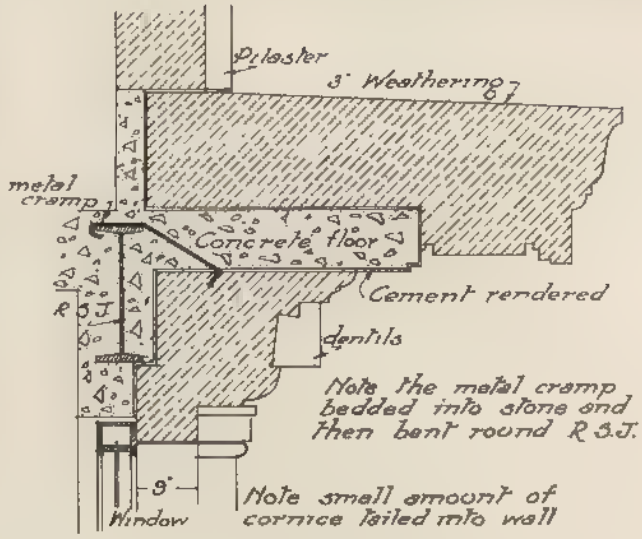
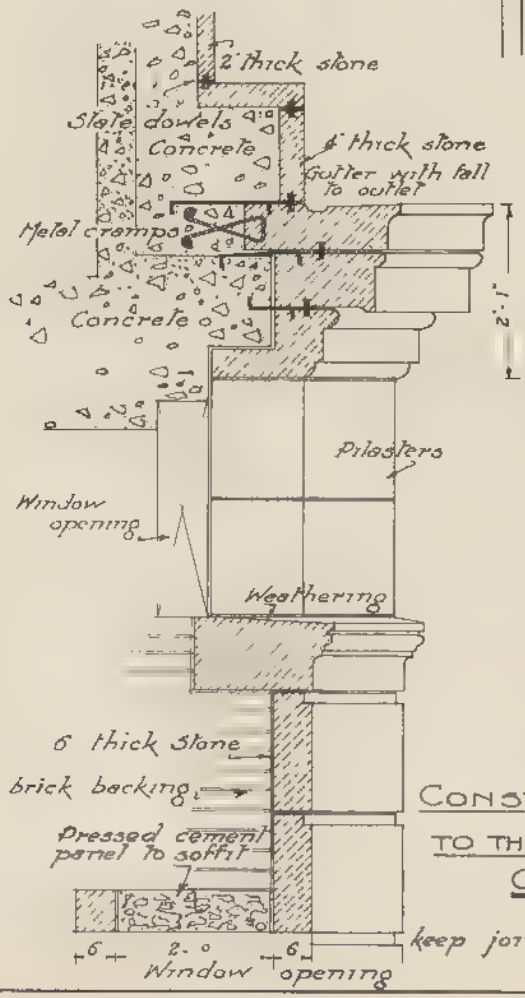
WORKS CARRIED OUT BY THE STANDARD QUARRIES PTY LTD FOOTSCRAY MELBOURNE

Stone supplied-cut and set







METHOD OF ANCHORING IN MAIN CORNICE OF THE STATE SAVINGS BANK ELIZABETH STREET MELBOURNE

The stonework for the New Wing of the State Savings Bank was carried out with Stawell Stone obtained from the Quarries of the Standard Quarries Pty Ltd which are situated in the Grampians about 16 miles from Stawell

The stone used in the New building for the Australian Mutual Provident Society. Collins Street Melbourne is Sydney Freestone.

The stonework for these two buildings was carried out by THE STANDARD QUARRIES Pty Ltd WEARING STREET FOOTSCRAY.

CONSTRUCTION OF CORNICE TO THE NEW A.M.P. BUILING COLLINS STREET MELBOURNE

(Continued on next page)

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SPECIFICATION FOR THE SUPPLY, CUTTING, FINISHING AND SETTING OF ARCHITECTURAL STONE

Note.—This Specification may be used in whole or in part, depending on whether the sub-contractor supply and/or cut and finish and/or set.

Use paragraphs which directly apply to the various kinds of stone.

MATERIALS.

(1) GENERAL.—The later specified stones shall be obtained from approved well-known quarries having the facilities and capacity for providing the quality and sizes of the stone required. In submitting estimates, the sub-contractor shall state name of stones, and quarries upon which his price is based.

(2) In quarrying all blocks shall be so selected that any variation in colour permitted by the architect will be uniformly distributed throughout the exposed surfaces and walls.

(3) SAMPLES.—The sub-contractor shall submit to the architect two samples of each kind of stone required, showing the extreme variations in the stone of which the sub-contractor proposes to provide.

(4) FREESTONES.—Freestones shall be absolutely sound and free from sand holes, discolourations and open beds, and shall be in all respects equivalent to the samples approved by the architect.

(5) Provide all material and labour and carry out all finishing, setting, and completion of all work in accordance with the drawings, the specifications herein, and the following schedule

Note. Include in schedule the thicknesses of the various portions that are to be in Freestone

(6) LIMESTONES.—Limestones shall be absolutely sound and free from discolourations, open beds, and all other defects which would mar its strength, durability or appearance. It shall be equivalent in all respects to the samples approved by the architect.

(7) [illegible] paragraph 5 and include detailed schedule of work [illegible] Limestone (including thickness s)

(8) All granite shall be of compact structure hard and practically non-absorbent with exposed faces reasonably free from black spots and white veins. Granite shall be (mention colour and texture) and equal in all respects to the sample approved by the architect. Granite for polishing shall be of a selected dark colour.

(9) Use paragraph 5 and include detailed schedule (including thicknesses) of work to be done in Granite).

(10) BLUESTONE.—All bluestone shall be of fine texture, free from corks and honeycombs.

(11) Use paragraph 5 and include detailed schedule of work to be in Bluestone.

CUTTING AND FINISHING.

(12) CUTTING AND SETTING DRAWINGS.—The sub-contractor shall prepare and submit to the architect for approval, complete cutting and setting drawings for all stones under this contract. No stone shall be cut until these drawings have been approved by the architect. Such drawings shall show by number or letter the position and dimensions of every stone, together with typical examples of joggles, dowelling, cramping and anchoring.

(13) CUTTING. All stones shall be accurately cut to shape and dimensions with jointing, as shown on the approved cutting and setting drawing. Beds and joints shall be at right angles to the face unless otherwise shown. Patching or hiding of defects will not be permitted.

(14) Unless otherwise specified, all stones shall be cut so that they may be laid on their natural bed.

(15) Freestones and limestones for cornices and copings shall be cut so that they may be joint bedded (that is, the natural bed of the stone is vertical, instead of horizontal), thus presenting to the weather, faces at the front, top and soffit, none of which are bedways. The return stones of these copings and cornices shall be cut with diagonal bed-joints so that when they are joint bedded there will be no appearance of a face bed on the return side.

Note. The above paragraph re cornices and copings does not app[illegible] Sandstone owing to its great compressive strength [illegible]

(16) CUTTING FOR LEWIS HOLES, DOWELLS, ANCHORS AND CRAMPS.—Cut all holes and sinkings for the Lewis bolts, dowells, anchors and cramps, as required in this specification, or as shown on drawings.

(17) MITRE ANGLES.—No mitre angles will be allowed in any part of the work.

BONDING

Note. In lieu of the intention to bond stone facing to the backing without the use of anchors, etc., the following will apply:

18 Ashlar facings shall be cut so that every course will be a bonding course with not less than a 4in. bond into backing. All projecting stonework shall have beds in the wall so that the centre of gravity of each stone will be well within the face of the walls

Note.—Ashlars facings that are bonded to walls are not permitted to be less than 4in. thick. If anchored, they may be of a lesser thickness as set out in the recommended table on page 44.

FINISHES.

(19) FREESTONES.—Generally, exposed surfaces, except where tooling or other finishes are specified, shall be smooth machined dressed (rubbed face), showing no signs of tool marks.

(20) LIMESTONE.—Drag finish, rippled finish

Note.—If required, prepare schedule indicating the various finishes to other portions of the work, or any variations to the above—see page 40

(21) GRANITE.—Exposed surfaces of granite shall be as indicated on drawing, and as set out in the following schedule:

Note. Prepare schedule, indicating various finishes to different portions of the work—see page 40.

(22) All polished faces shall be free from winds and shall consist of a fine, even glass surface polished with oxide of tin (putty powder) with no addition of Spirits of Sorrell or Muriatic Acid.

(23) BLUESTONE.—Exposed surfaces of bluestone shall be as indicated on drawings, and as set out in the following schedule:—

Note.—Prepare a schedule as before. Most of the finishes (excepting polishing) that can be applied to granite can also be applied to bluestone—see page 40

(24) MOULDINGS.—All mouldings and arrises shall be clean and sharp and in strict conformity with details, curves shall be uniformly continuous when assembled. Re entrant angles shall be cut from the solid; no mitre joints will be allowed.

(25) CARVINGS.—No carved work shall be done from the drawings, but from plaster cast prepared from clay models approved by the architect.

Sufficient stock shall be left for the carving. The carving shall be carried out in strict conformity to the models by professional carvers approved of by the architect.

Carving may be done either on the ground or in position after the building is up, as directed by the architect.

(26) SILLS.—All window sills shall be in one stone each and weathered as shown on drawings.

STONE SETTING.

(27) SETTING MORTAR.—Mortar for setting Freestone, Granite, and Bluestone shall consist of three parts of clean, sharp well washed sand to one part of Portland cement. Mortar for setting Limestone shall consist of four parts of clean, sharp, well-washed sand, two parts of hydrated lime, or well-slaked lump lime, and one part of Portland cement, which shall be added on the mortar board.

(28) SETTING.—All stone work shall be set as shown on the approved "Cutting and Setting" drawings

Before setting, all stone shall be cleaned with a fibre brush and drenched with water.

(29) Bonded ashlars facing shall be bonded into the backing every [illegible] course with not less than a 4in. bond, or

(30) Anchors may be substituted for bonding courses if spaced to provide an anchor every 2 sq. ft. of wall surfaces.

(31) Each stone shall be bedded in a full bed of mortar with beds and vertical joints 3/16th in. thick.

Mortar shall be raked out ¾in. from the face of the joints for pointing.

(32) POINTING.—After the completion of facing, the work shall be carefully cleaned down and the joints raked out, thoroughly wetted with water, and carefully pointed with [illegible] (mar[illegible] pointing mortar) to the architect's satisfaction

(33) ANCHORS, DOWELS, ETC.—Provide and set all metal anchors dowels, and cramps necessary to secure all cut stone.

(34) Unless otherwise specified, cramps and anchors for securing ashlar facings shall be as follows: Stones up to 2in. thick shall be secured by ¼in. diam. brass or galvanized anchors one end turned down into stone and the other cramped to hold in the backing. Stones over 2in. and up to 4in. thick shall be anchored with 1 x ⅛in. galvanized iron cramps, shaped to fit the cramp holes in the stone and with a right angle bend fitted into backing. All cramps and anchors shall be grouted in with cement mortar.

Note.—Include in specification special anchorage for projecting cornices, columns, balustrades, etc

(35) All copings shall be cramped at the joints with approved slate cramps.

(36) PROTECTION.—All stone work shall be protected by the general contractor during the progress of the work and until completion of the building. No timber shall be used that in any way will stain or deface stonework.

(37) SCAFFOLDING AND CENTREING.—The general contractor shall provide all necessary scaffolding, centreing, staging, etc., required for setting and carving.

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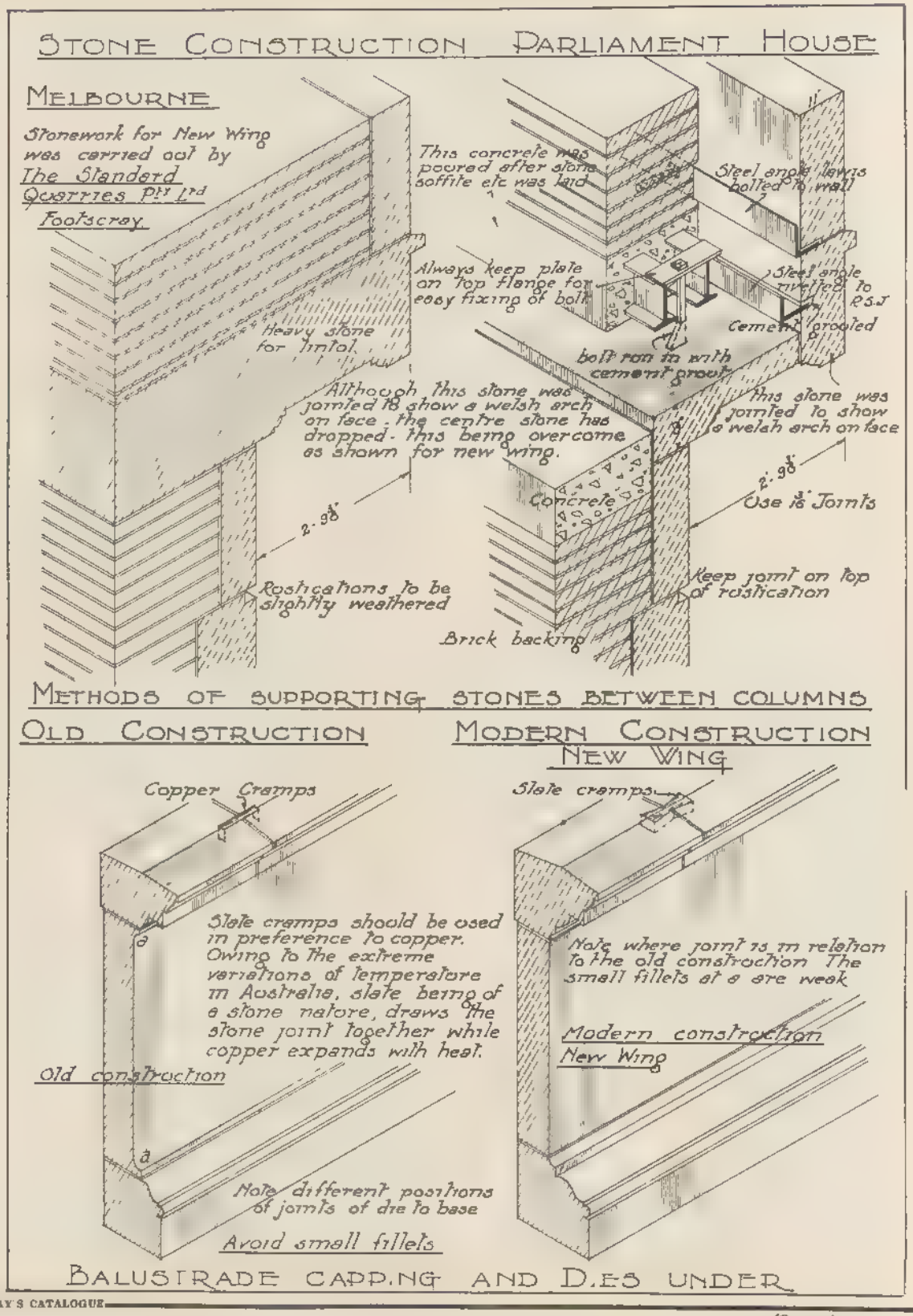

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From the collections of Sydney Living Museums / Historic Houses Trust of NSW

MARBLE AND STONE

WM. TRAIN & CO. PTY. LTD.

Marble, Stone and Granite Merchants and Quarry Proprietors

37 STURT STREET, SOUTH MELBOURNE, VICTORIA

TELEPHONE: M 2592

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MARBLE

Products

We have successfully employed marble in the following capacities:

Interior columns pilasters, wall linings, architraves, staircases and pavings

Church work (see next page)

Stair boards, fascias protected from the weather: counter tops and fronts

In chimneypieces, window shelves, bathroom wall linings staircase treads risers and strings, switch boards

In mural tablets, memorials, etc.

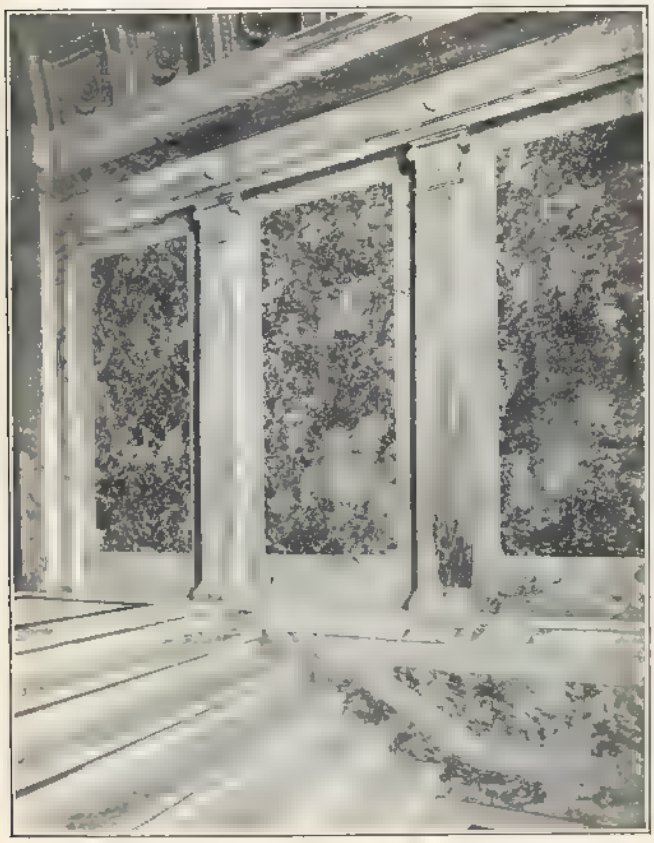
Our equipment for working marble and stone is complete and efficient

Preliminary estimates and samples are furnished on request.

A Mural with figures etched by sand blast in Buchan marble. Arcade of the Manchester Unity Building, Melbourne.

Stocks

We stock in our own yard, graded for uniformity and quality, adequate supply of rough blocks of imported and local marble such as Sicilian, Rouge, Blue Belge, Belgian Black, Caleula, Angaston, Onyx, Buchan.



Panelling and Staircases in Coloured marble in the entrance hall to the Port Authority Building, Melbourne.

Dado Panelling—Office Building, Melbourne

Partial List of Representative Work

Manchester Unity Building Architect Marcus R. Barlow
Melbourne Town Hall Architects Stephenson & Meldrum
Port Authority Building Architects Sydney Smith Ogg & Serpell
T & G Insurance Building Architects A & K Henderson
Fortune Theatre Building Architects Oakley & Parkes
Taxation Office, Melbourne Architects Oakley & Parkes

(Continued on next page

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ECCLESIASTICAL MARBLE WORK

Products and Services

We are designers, sculptors and makers of high grade ecclesiastical work such as altars, altar railings, reredoses, baldachinos and pulpits, statues stations of the cross, cemetery groups, baptismal fonts monuments, apse and chancel wall linings, chancel steps and pavings

Altars

The beauty of the altar and its fitness in the chancel depends on the degree of success attained in correctly rendering the architect's design.

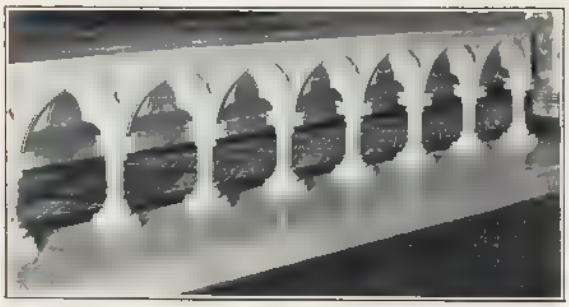
We have facilities for producing artistic work and our work of the past is sufficient endorsement to content us with the performance of a task so vital to the artistic impression of the church interior

An exquisite example of a Church Altar—Convent of Good Shepherd, Oakleigh, Victoria executed in various Italian marbles, erected by Wm Train & Co Pty. Ltd., and typical of the class of work undertaken by this firm.

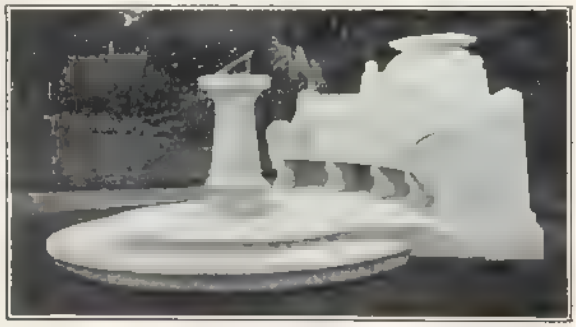
Mosaic Floors

We execute all kinds of marble mosaic floors sketches and details being submitted for the architect's approval. Mosaic is the most permanent, satisfactory and beautiful method of adding colour to an architectural scheme. Only sound marbles are used, insuring durable floors

Roman marble mosaic is made up of small marble pieces from ½ in to ¾ in. in size, bedded in Portland cement in a sub-base of clean sand and cement Allow a total depth of 1 in. from the screeded floor slab, to be level and without holes



Church Railing in white marble — the whole of the work of this design was executed on machines in the yards of Wm. Train & Co. Pty. Ltd.



Sundial and Seat in Stawell Stone—the ideal weathering stone.

ARCHITECTURAL STONE WORK

Although well known as marble merchants, we have for many years quarried and worked in all kinds of soft and hard stone, as Stawell stone, sandstone, granites, limestone, bluestone, etc

We are equipped with gang saws, circular carborundum saws, planers and various kinds of special machinery for the production of cut and moulded stone and various kinds of rubbed and polished finishes.

Our technical staff is able to render architects and contractors valuable assistance in planning stone structures Samples of stone to show colour, texture, finish, will be gladly sent on request

Representative work by this firm are the following buildings: Manchester Unity, Taxation Offices, Melbourne Town Hall, Equity Trustees, "Newspaper House."

(Continued on next page)

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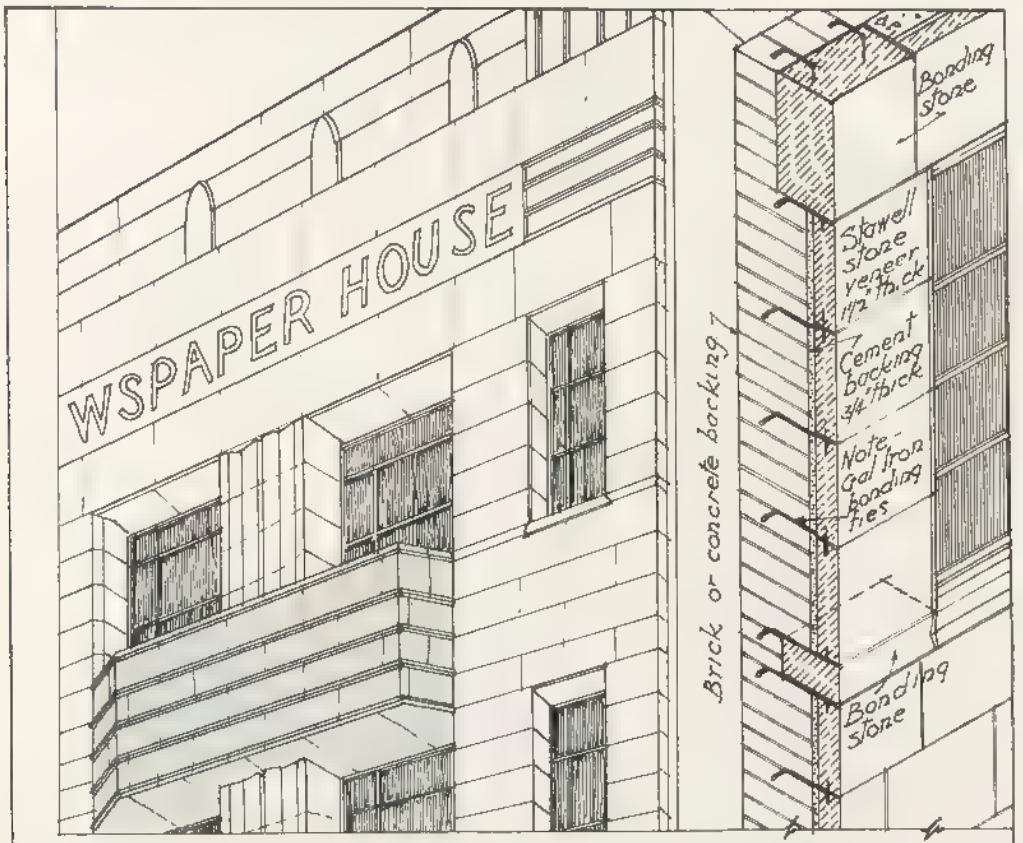
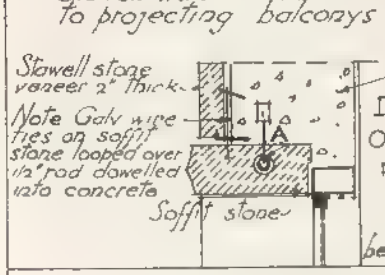
FACING FOR FACADE WORK

A most revolutionary practice in stonework has recently been carried out by Wm. Train & Co. Pty. Ltd. on the new front of 'Newspaper House' Collins Street, Melbourne. The facade of this building is faced with stone only an inch and a half thick. This economy of material and simplicity of construction is due in great part to the use of Stawell stone. The wonderful quality of Stawell stone, as exemplified by its great crushing strength—17,950 lbs. per sq. in. as compared, for instance, with Harcourt granite at 11,440 lbs. per sq. in., permits the use of thin sections, 1½ in. or 2 in. thick. Details of this new construction are set out below. Stawell stone, white or coloured, is available from our quarries near Stawell. Large stocks are always available in Melbourne.

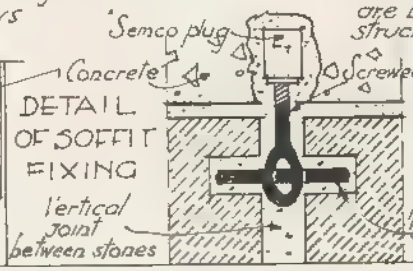


UPPER PART OF ELEVATION
The front elevation is finished in White Stawell with brown variegated Stawell to projecting balconys

DETAIL OF BONDING STONES
At window cill & head levels through stones are bonded into the structural backing 4½".



DETAIL OF SOFFIT FIXING



DETAIL OF "A" SHOWING FIXING BOLT

NEWSPAPER HOUSE COLLINS ST MELB'NE
FRONT ELEVATION DESIGNED BY STEPHENSON & MELDRUM. ARCH'TS

The front elevation is veneered with Stawell stone 2" thick & is secured to structural backing with galv. wire ties, 4 to each stone. Bonding stones are fixed as shown on above details...

(The stonework of the above contract was quarried, cut and erected by Wm. Train & Co. Pty. Ltd. founded 1869)

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S. A. File No.

STANDARD QUARRIES PTY. LTD.

WEARING STREET, FOOTSCRAY
VICTORIA

Phone Footscray 1111 (2 lines)

MASONRY CONTRACTORS QUARRY MASTERS

STANDARD

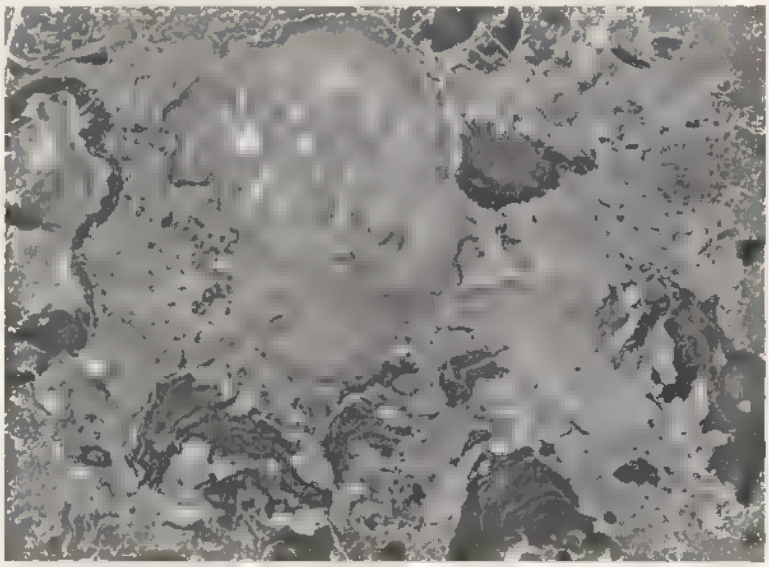
NEW MARBLES

Marble has ever played an important part in the construction of the world's great buildings without controversy, marble may be said to be a pre-eminent building material, and of building stones the most delicate.

Marbles are limestones "which have been changed from their original amorphous state into a crystalline condition." Most marbles are capable of taking a high polish. There are many beautiful marbles in Australia—those in New South Wales and South Australia, together with the well-known Buchan marble of Victoria, have been used somewhat in the interior decoration of buildings. Foreign marbles have been brought into this country for years, notwithstanding that geologists and others have pointed out the Australian marbles are for the most part distinguished by their beautiful and rare colourings.

In line with its policy of making available for the building field the little known stones of Victoria, the Standard Quarries Pty. Ltd., during its search for suitable and easily-worked stone, have found a marble deposit of substantial and highly-figured material. It is with much satisfaction and confidence in its reception that this newly-discovered Victorian marble is now made available in commercial quantities for use more particularly in interior work. This new product will be known as "Standard" Marbles.

MARBLE
BY
STANDARD QUARRIES



An example of the beautiful figuring in the dark grey Standard Marble.

Description of Standard Marbles

The variations in colour and figuring are so widespread in these marbles that no single illustration, even in colour, can do justice to this material in showing the extent of its range. The illustration on this page will serve to introduce the figuring to architects and builders.

There are seven well-defined classes of Standard Marble, which may be listed:—

Standard No. 1—Light grey
Standard No. 2—Dark grey

These marbles have a grey background with dark flowery designs. In Standard No. 2, endless little rivers in veins of light colour are sharply defined.

Standard No. 3—Light rouge.
Standard No. 4—Dark rouge.

These marbles are of many varieties, all showing a more or less red-brown colour with grey and black spots.

Standard No. 5—Mottled.
Standard No. 6—Rainbow
Standard No. 7—Banded.

Mottled—as the name implies—shows a variegated appearance in colour and markings.

Rainbow presents a series of colours graduating through the whole range of Standard colours.

Banded shows well-defined bands of alternate colours.

All these marbles take on a distinctive high polish and are suitable for interior work, although they may be used externally under verandahs for shop fronts. It is also suitable for decorative panels, altars and mantel friezes, pavings, steps and stairs and dadoes being their usual sphere. Standard Marbles are non-absorbing, strong and easily workable. The average compression strength is similar to Buchan (about 12,000 lbs. per sq. in.), and much higher than Caluela marble.

Stocks, Deliveries, Samples

Ample stocks are available for large contracts. Standard Quarries will supply the marble in rough or polished slabs. A marble-finishing plant at Footscray is equipped and manned to produce the best class of workmanship, and for this reason we are in a unique position to maintain a continuous operation from raw material through the many shop operations to fixing complete on the job. Samples of these seven Standard Marbles will be readily supplied to all architects.

(Continued on next page)

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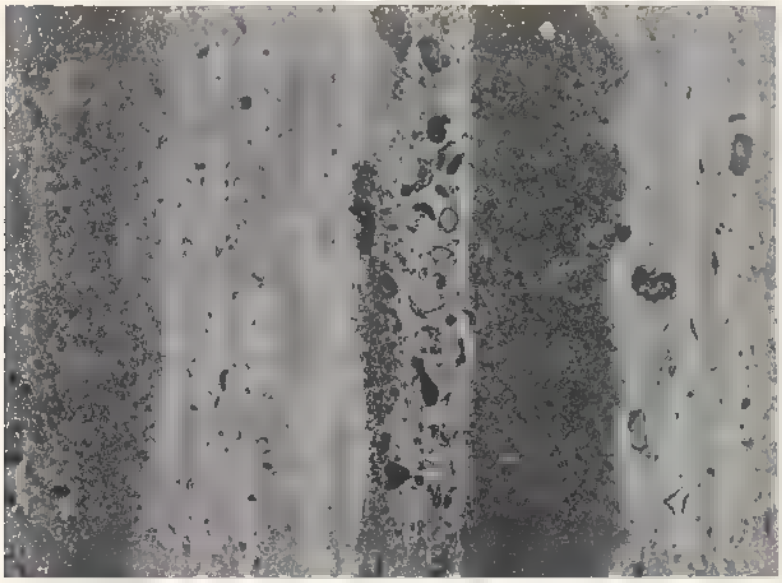


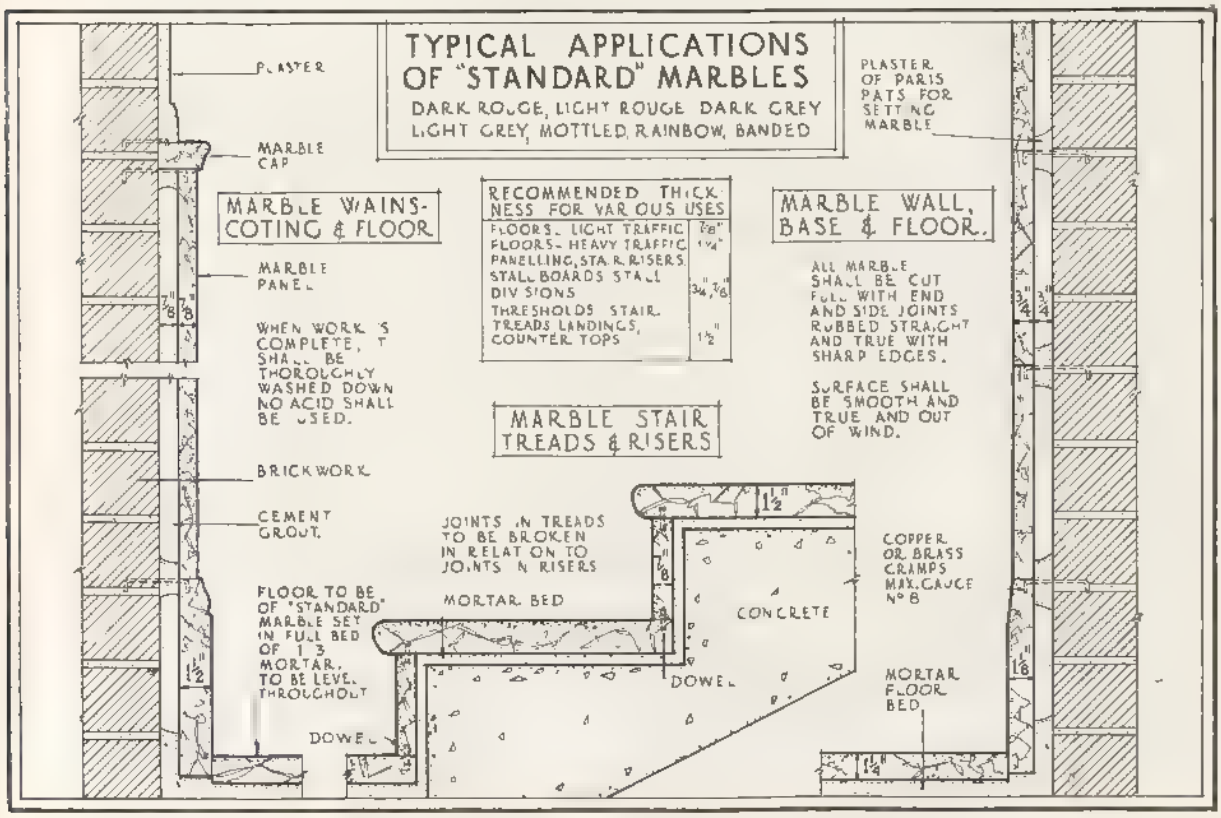
MARBLE BY STANDARD QUARRIES

This photograph of Standard Rainbow Marble shows the distinct rainbow markings, which in the original range from grey to rouge

Fixing Marble

Standard Marbles are fixed in the usual manner. Slabs for lining walls or soffits are ¾ or ⅞ inch thick, highly polished. Marbles are set in cement mortar and wall marbles are securely anchored with brass or copper wire

There are two methods of setting up marble, one where it represents ashlar, being squared and bonded and following accepted stone practice, and the other in panels where it conforms more to joinery practice. The general tendency by most architects nowadays is to conform to the ashlar type for vestibules and dadoes, using a different colour for bases, caps or strings



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8c

PICTON HOPKINS & SON PTY. LTD.

Manufacturers of Pre-Cast Stone

265A BRIDGE ROAD, RICHMOND, VIC.

TELEPHONES S2160 2169

8c

[For Other Products See Index]

Adaptability of Pre-Cast Stone

Pre-cast Stone, as manufactured by Picton Hopkins & Son Pty. Ltd., is a cast stone of exceptional strength and durability It is not offered as a cheap substitute for stone or other materials, but as a material having its own artistic expression and individual characteristics making it adaptable for either trim in conjunction with brickwork or for entire buildings.

Pre-cast Stone readily lends itself to the moulding of intricate shapes and ornamental details, and further, there are endless possibilities of adding colour to architectural design by the use of various coloured aggregates and cements.

In addition to its very important use as a building stone and architectural ornament, it is a most popular material for the reproduction of garden furniture, sundials, garden seats, gazing globes, lighting standards, pergolas, etc., may be all given a most pleasing appearance in this material. Pre-cast stone can be carved, and has some advantages over natural stone, owing to the absence of flaws, and the uniformity of the material. Our experienced staff of designers are continually evolving new designs and will gladly co-operate with the architect in the development of his ideas and suggestions

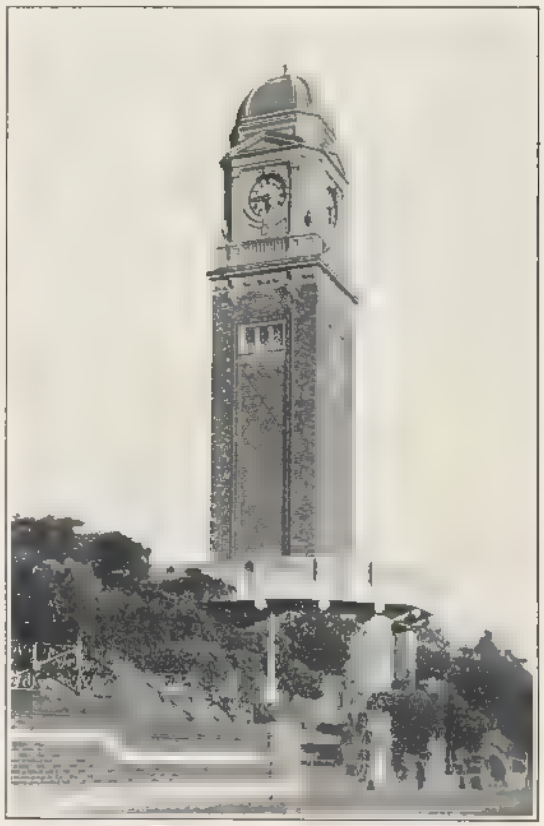
Manufacture

A distinguishing feature of the process of manufacture is that the facing of the stone is cast integrally with the backing

This is done by either of two methods: (1) With a facing material of 3 inch thickness, consisting of the natural stone aggregate crushed to a suitable size and mixed with cement, placed in a mould and filled with a backing of stone chippings and cement, or (2) With the natural stone aggregate cast solid throughout

Colour is obtained either by the natural colour of the aggregate or by adding coloured cements or pigments

Where an imitative use of the pre-cast stone is wanted, many forms of dragged, tooled and axed finishings can be obtained when casting in the special moulds Almost any stone can be matched in colour and texture



CATANI MEMORIAL TOWER, ST. KILDA, VIC.
A recent example of Pre-Cast Stone work by Picton Hopkins & Son Pty. Ltd

Erection and Building In

Beyond the considerations of transportation and easy handling, there is no limit regarding size, in which pre-cast stone can be made for structural building purposes. Lifting rings for stones of any weight can be cast simultaneously with the pre-cast stone, eliminating, of course, the labour costs of cutting Lewis holes

Pre-cast stone can be reinforced, as in the case of reinforced concrete, for such purposes as forming projecting cornices and balconies, door and window lintels, etc Furthermore, bolts, bars, anchors, etc., can be embedded while casting and left projecting ready for building in or anchoring to brickwork or other masonry backing

The use of pre-cast stone for stair treads and rises is now a general feature, and unquestionably provides an excellent type of fire-resisting, non-slip construction The treads and rises can be cast with square or moulded return edges and spandrels, suitable for close and open string staircases respectively

Comparative Cost

Apart from the considerable saving effected as already noted when pre-cast stone is used in lieu of ordinary building stone, there should be considered the great increased reduction of cost in repetition work — *particularly mouldings and ornamental work* With ordinary stone this means the expense of a stone carver working on each individual block, whereas with pre-cast stone the one mould necessary to form one block will produce numerous blocks, each of a uniform and consistent finish without any of the flaws sometimes encountered in stonework The saving thus effected is therefore of great consequence, it may be from 25 to 50 per cent, depending on the nature of the work involved.

Co-operation

Picton Hopkins & Son Pty Ltd, are prepared to assist all architects considering the use of pre-cast stone, in selecting materials best fitted to their requirements, and in making preliminary estimates, sketches and specifications

Samples of many varieties of finishes will be gladly furnished on request

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Architects:-
Gawler &
Drummond

Contractor:-
R. Meredith

Facade of
Melbourne University
Entirely constructed of
Pre-Cast Stone
by
Picton Hopkins & Son
Pty. Ltd.
Richmond Vict.

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9

S.A.A. File No.

WUNDERLICH LIMITED

Manufacturers of

WUNDERLICH TERRA COTTA

Administration: BAPTIST STREET, REDFERN, SYDNEY, N.S.W.

Showrooms and Offices

SYDNEY: Baptist Street, Redfern.
STH. MELBOURNE: 210 Hanna Street
ADELAIDE: Grote and Morphett Streets.
PERTH: Lord and Short Streets.
BRISBANE: Amelia Street, Valley.
NEWCASTLE: Builders' Exchange, King St.
HOBART: 139 Macquarie Street.
LAUNCESTON: 71 St. John Street.

[For Other Products, See Index]

Description

Broadly speaking, Wunderlich Terra Cotta is a burned-clay product, usually with a glazed face, made specially for a pre-determined position on a building. In its simplest form (i.e., as ashlar), it may be described as blocks of burned clay, about 4 inches thick, left hollow at the back

An Ideal "Facing" Material

The general use of Wunderlich Terra Cotta is as a "facing" for buildings; but it is employed, also, to enrich a facade of another standard material, such as brick or stone; or as a decorative element in the treatment of building interiors

Wide Palette of Colours

Wunderlich Terra Cotta excels all other "facing" materials in the almost limitless palette of rich colours it offers for the architect's selection. There are available to-day the natural burned clay finishes mainly shades of red, chocolate, buff and grey, also glazed effects, of either dull matt or lustrous appearance. These colours range from milky white and cream tints to brilliant yellows, warm browns and bronze; from emerald to dark greens; and from delicate lavenders to bright or deep blues. Furthermore there are mixed colours, harmonising closely with natural geological formations. Individual blocks may partake of one colour only, or any combination of colours.

Economy of Ornamental Treatment

Being plastic by nature, Wunderlich Terra Cotta will respond to any scheme of moulded or modelled ornamentation the architect may impose; and where decorative detail repeats in the design, this material will be found decidedly economical, as once the original model of each repetitive unit has been completed, the ornamental blocks can be duplicated with virtually the same facility as plain work

Entrance Doorway in Polychrome Terra Cotta

Permanent—and Always Clean

The durability of Wunderlich Terra Cotta is unquestioned. Even when subjected to the intense heat of a conflagration, this material remains unaltered. Its glazed surface offers no lodgment for smoke or dust, hence every shower of rain restores the pristine cleanliness of the surface

Suited to Modern Construction

Wunderlich Terra Cotta is readily anchored to concrete or bonded in with brickwork. As it is merely a "shell," and therefore lighter in weight than solid materials, it imposes only a minimum load on the structural elements of a building. It is easy to hoist and handle into position.

Reasons for Preferment

Architects choose Wunderlich Terra Cotta as a material for the "facing" or enrichment of a building because it offers unfettered opportunities for achieving both the unusual and the distinctive, in modelled form and chromatic effect; and because the results so obtained are assured for all time. Even for outstanding effects by night, this material is found to be pre-eminently the right medium, as the light-reflecting glazed finish possesses particular resplendence when illuminated by flood-light

The Cost

As Wunderlich Terra Cotta is specially manufactured for specific positions on a building, the price depends on the extent of the work, amount and repetition of ornamental detail, and the colour effects desired. On receipt of scale plans, elevations and sections, and a clear indication as to the extent and character of the modelling and colour scheme involved, we will furnish an estimate for the manufacture and delivery of the material to the site of the job. Fixing is invariably carried out by the building contractor's workmen

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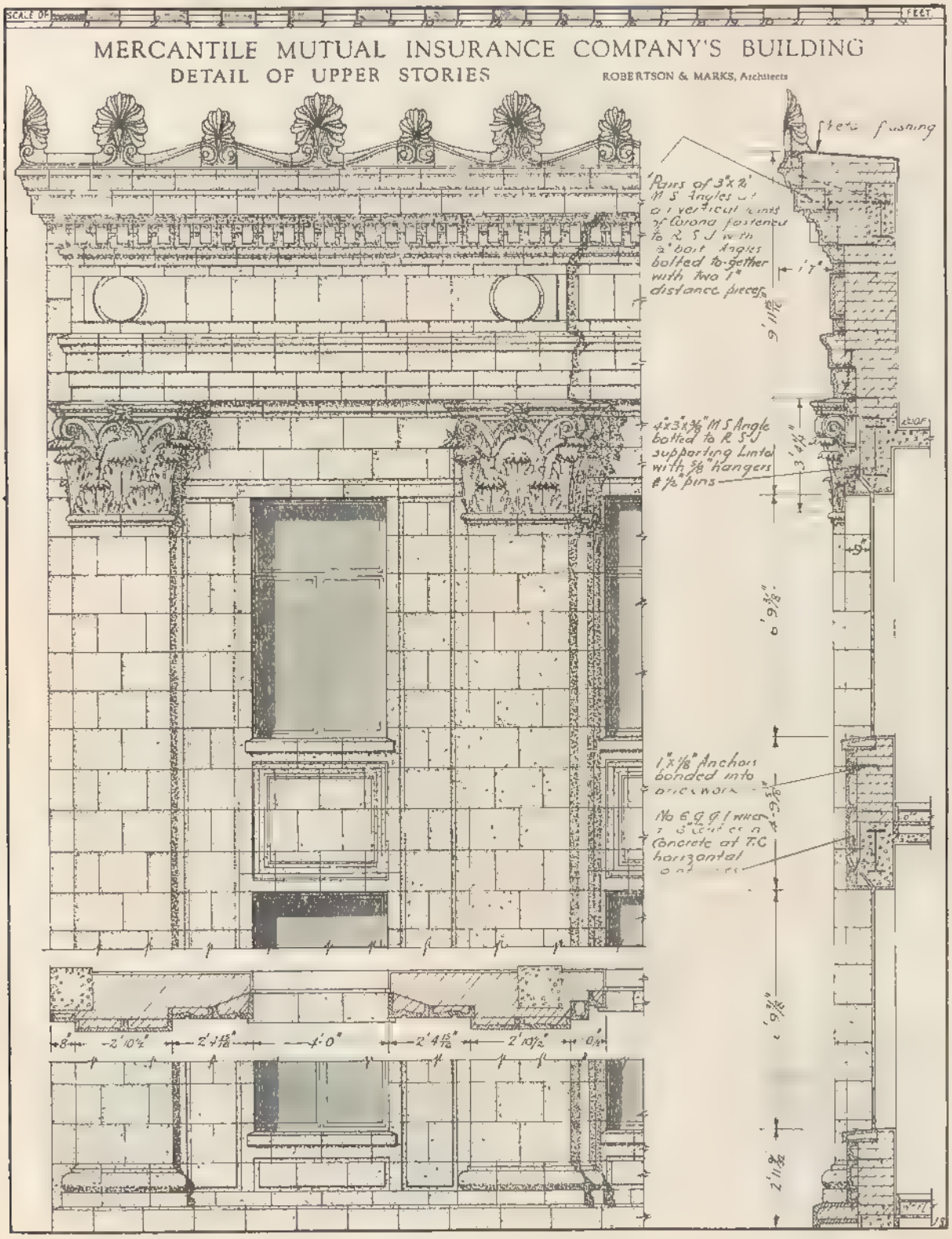

TYPICAL FIXING DETAILS—WUNDERLICH TERRA COTTA.

(Continued on next page)

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Early Co-operation is Desirable

Architects are asked to enlist our early co-operation where our Terra Cotta is involved, as the whole question should be settled before the structural elements of a building are finalised. Also, it is possible that by a slight variation in the design of a building, real savings can be effected ultimately in the manufacture of the Terra Cotta.

Stock Designs

At our Works at Rosehill (near Sydney) and Sunshine (near Melbourne), we have available a range of models of Paterae, Finials, Columns, Capitals, Bases, Consoles, Ecclesiastical Enrichments, etc., which architects may find adaptable to work in view, thus obviating the cost of preparing special models. On receipt of rough sketches and dimensions, we will forward particulars of any similar architectural ornament or motive for which we possess the model.

Printed Information

Profusely illustrated Bulletins relating to Wunderlich Terra Cotta will be sent post free to any architect requesting them.

Contracts Completed

In every capital city of the Commonwealth we have carried out contracts embracing Terra Cotta to entire facades — as well as enrichment to facades largely of another material. A list will be furnished on request.

Glazed Terra Cotta Bricks

Wunderlich Glazed Terra Cotta Bricks are made from Terra Cotta clay, and possess a colourful glazed face similar to Terra Cotta Blocks, but, unlike the blocks, they have a solid clay body. Whereas Terra Cotta Blocks have to be specially made for a particular place on a building, these bricks are available from stock and bond in with ordinary building bricks, thus offering a particular service to Architects.

Standard colours range from a light cream speckled with dark spots to dark green, the bricks being available in one standard size only —9 in. x 4½ in. x 3 in.

They are ideal for both exterior and interior use, and are particularly adapted where plain surfaces are desired. Excellent effects can be obtained by incorporating bands or courses of bricks of harmonious or contrasting colours in any treatment.

Terra Cotta Parapet Copings and Window Sills

Manufactured in stock designs in Cream Glazed Terra Cotta, Wunderlich Parapet Copings and Window Sills offer permanent, clean glazed surfaces which do not permit of a foothold for the lodgment of dirt and dust and furthermore, are impervious to external moisture.

The Parapet Coping is made in unit length blocks of 18 in., whilst to make up any length which is not an exact multiple of 18 in. shorter blocks are available. External and Internal Mitre Blocks for use in conjunction with the Coping Mold are stocked to suit the various designs.

The Window Sill is available in unit lengths, which together with the End Stool blocks, suit standard openings and align with standard courses of brickwork. The Sills can also be supplied for any other width of opening.

Glazed Stoneware Pipes and Fittings

For all sewerage and drainage work, Wunderlich Stoneware Pipes and Fittings are unexcelled. Made with faultless, smooth salt-glazed surfaces, vitrified stoneware pipes are practically indestructible and offer a perfect resistant to the chemical action of sewerage waste, and externally, to the acids and alkalies of the earth.

Manufactured at our works in Sydney and Perth in conformity with the requirements of the local authorities, the pipes are available in all the standard sizes, whilst fittings of every type for use in conjunction with them in all classes of drainage and sewerage schemes are stocked.

Wunderlich Terra Cotta Products

Hooded and Louvred Terra Cotta AIR BRICKS—sizes 9 in. x 6 in. and 9 in. x 3 in.—for Wall Ventilation offer protection from driving rain.

Terra Cotta LETTER BOX BRICKS—sizes 9 in. x 6in. —for front fences or gate piers.

Terra Cotta CHIMNEY POTS, square and circular, with or without hoods, in various sizes.

GARDEN ORNAMENTS, including Vases, Flower Boxes, Sun Dials, Bird Baths and Garden Seats, in glazed or unglazed Terra Cotta of Standard Colours.

Terra Cotta FLOORING TILES, size 8 in. and 6 in. square, with rectangular and triangular half tiles to match; made in shades of red and chocolate.

FIRE PLACES to stock designs in Glazed Terra Cotta.

Garden Vase in Terra Cotta Glazed or Unglazed

Terra Cotta Louvre Vent.

Garden Vase in Terra Cotta Glazed or Unglazed

Terra Cotta Chimney Pot, with Hood.

Garden Vase in Terra Cotta Glazed or Unglazed

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SECTION C

[Containing S.A.A. Filing Section No. 10]

HOLLOW BLOCK CONSTRUCTION

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

10a

S.A.A. File No.

THE LIVERPOOL TILE AND TERRA COTTA COMPANY LIMITED

L.T.C.

Te
B W 1525

12 CASTLEREAGH STREET,
SYDNEY

Works:
Atkinson St., Liverpool, N.S.W.

General

The Liverpool Tile & Terra Cotta Co. Ltd. are the oldest manufacturers in New South Wales of Terra Cotta Blocks for all structural purposes

The blocks and tiles manufactured by us are registered as "L T.C" blocks, and are known by architects and builders under this name, also the structural terra cotta tile floor constructed by us is patented as the "L.T C. Patent Terra Cotta Tile Floor," thus builders and architects should carefully note that "L.T.C" should be used when specifying terra cotta for all structural purposes when sound, thermal, and fireproof qualities are required in addition to economy

Any unusual construction features not shown in this catalogue will be promptly provided for by special designs, as our Structural Engineer is always at the complete disposal of architects and builders.

Products

1. "L.T.C." Structural Terra Cotta Blocks for partitions in all classes of buildings

2. "L.T.C." Structural Terra Cotta Blocks for lintel construction over windows and doorways in partitions, and for backing up brickwork in external walls.

3. "L.T.C." Structural Terra Cotta Blocks and Tiles as a fireproof casing to beams, girders and columns

4. "L.T.C." Patent Structural Terra Cotta Tile Floor "The long span wide panel floor."

Terra Cotta Tile

ADVANTAGES

A few of the points wherein the "L T.C" structural terra cotta hollow tile excels are:

(a) It is composed of clay which has been burned in a kiln at a temperature of 2000 deg. F

(b) The quality of the tile may be judged accurately from its appearance

(c) It is composed of one of the highest and strongest materials used for structural purposes.

(d) The construction with this tile is not only absolutely fireproof, but it is also more nearly soundproof than any solid construction can be.

(e) The thermal qualities for insulation in roof and other construction are extremely high

The "L.T.C." partition blocks for floors, roofs, partitions, lintels and fireproofing to steel framework are composed of material of the same qualities, and thus a similar material may be used for all classes of construction

The L.T.C. Patent Structural Terra Cotta Tile Floor

The "Long Span-Wide Panel" Floor

For many years architects and builders have been anxious to secure long spans, with wide panels or bays, and such a condition is now possible with the introduction of the "L.T.C. Patent Floor."

The "L.T.C. Patent Floor" is suitable for all types of loading and for spans up to as long as 28 feet.

Its principal advantages are —

(a) All columns, beams, girders and ceilings are completely faced with same material, viz., terra cotta.
This ensures the same conditions throughout for surface plastering
No existing type of floor gives this condition, which is so essential from a finished architectural point of view

(b) Increased structural safety is obtained by the use of a structural terra cotta tile, between concrete ribs.

(c) The elimination of centering or formwork for columns beams, girders, and a 95 per cent. reduction for floor surface.

The only formwork required consists of scaffold planks or a small yoke and soffit timber for the tile bearing at joints.

The "L.T.C." Patent Structural Terra Cotta Tile Floor is the strongest and the lightest fireproof floor construction for long spans. The function of a long span floor such as this is to dispense with the need of frequent supporting steel beams, thus vastly cheapening the cost of the building and improving the building architecturally

The "L.T.C." Patent Structural Terra Cotta Tile Floor, by using a special structural material, cannot be molecularly damaged by fire in any way whatsoever

This type of floor has been tested in every possible manner, both in theory and practice, and it has fulfilled every claim made for it.

The first requisite of any floor is that it shall have strength enough to carry the live load expected to be placed upon it, with a factor of safety sufficient to sustain any extraordinary load that may be put upon it—the dead weight should be a minimum, for the less the dead weight, the more economical is the general structure.

The "L.T.C." patent floor gives all this, and it may be used for all types of loading.

It is an excellent non conductor of sound, being far superior to any solid floor construction or other type using hollow tiles, and it is also excellent as a form of Roof Construction, where coolness is desirable.

In conclusion, it may be stated that the "L.T.C" Patent Structural Terra Cotta Tile Floor, being a product of The Liverpool Tile and Terra Cotta Co. Ltd., may be looked upon as being entirely fireproof, structurally sound, and the most economical type of construction on the market.

Service to Architects, Builders and Engineers

The Liverpool Tile & Terra Cotta Co. Ltd., who have patented the "L T.C." Structural Hollow Tile Floor, supply terra cotta tiles and steel reinforcement complete for the "L.T.C." floor, for any type of construction and loading

If desired, designs will be carried out by the Structural Engineer to the Company and his staff, free of charge.

No special charge whatever is made for designs, estimates are freely given, and supervision of construction is carried out where the "L.T.C." Patent Structural Terra Cotta Tile Floor is specified.

All terra cotta tiles are delivered to any locality where the construction is being carried out, together with steel reinforcement bundled, labelled and ready for fixing in accordance with the plans prepared by the Company and issued to the architects and builders at no extra cost to either.

When specifying the "L.T.C." floor, the estimate of cost is made at a definite cost per sq. yd. of floor area, inclusive of the supply of terra cotta tiles for the span and the loading of the panel, also the necessary steel reinforcement.

In addition, the number of cubic yards of concrete per sq. yard of floor area to be supported is given, with number of tiles per sq. yd. of floor area.

List of Representative Work

Commonwealth Bank Head Office
Government Savings Bank Head Office
Kembla Buildings.
Winchcombe, Carson Buildings.
Underground Liverpool Street Station.
Underground Wynyard Square Station and Central Station
T. & G. Buildings, Druids' House, Hotel Morris, M.U.I.O.O.F Buildings, Hotel Savoy Pacific House, Stanton House, Federal Mutual Buildings

(Continued on next page)

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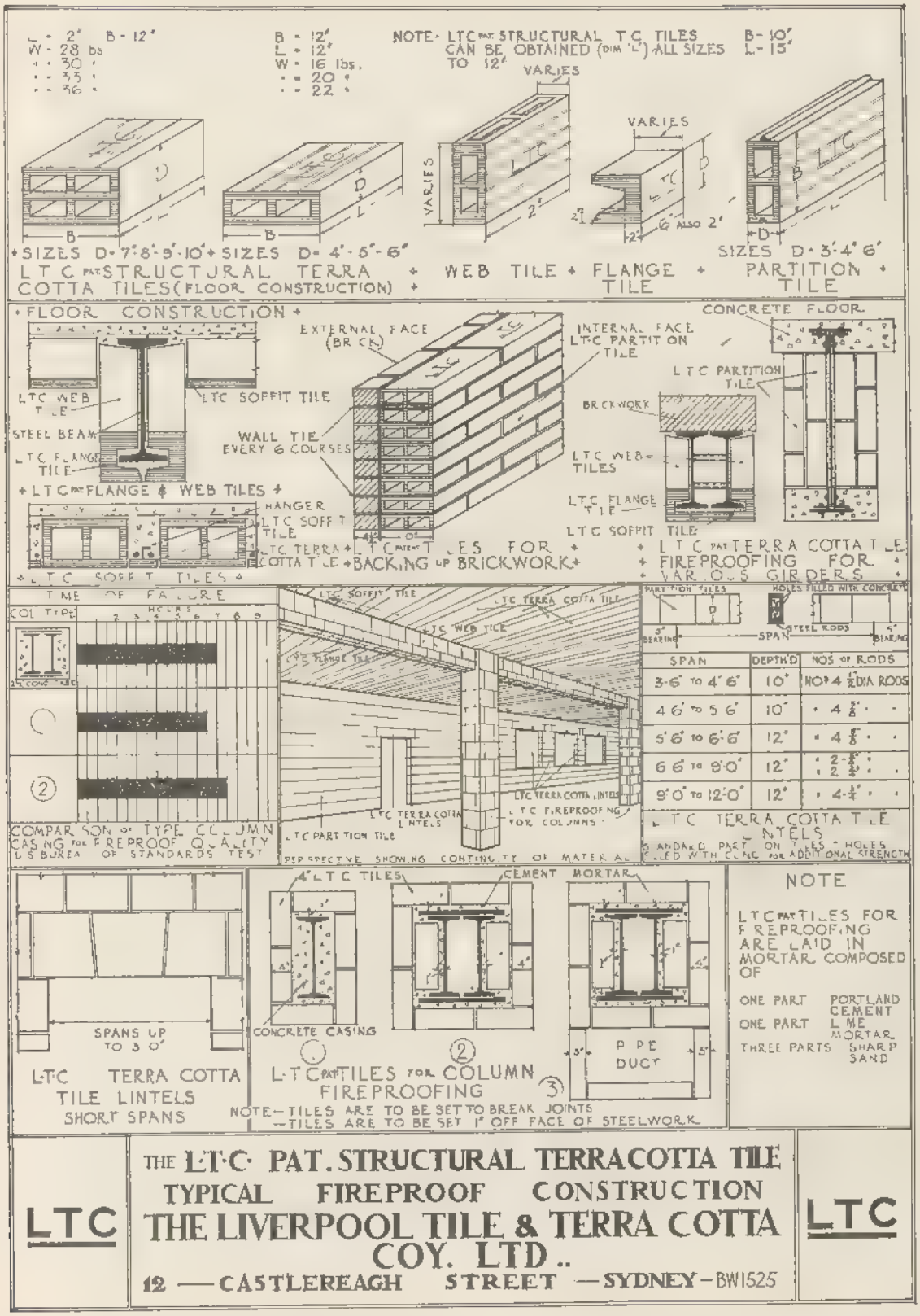

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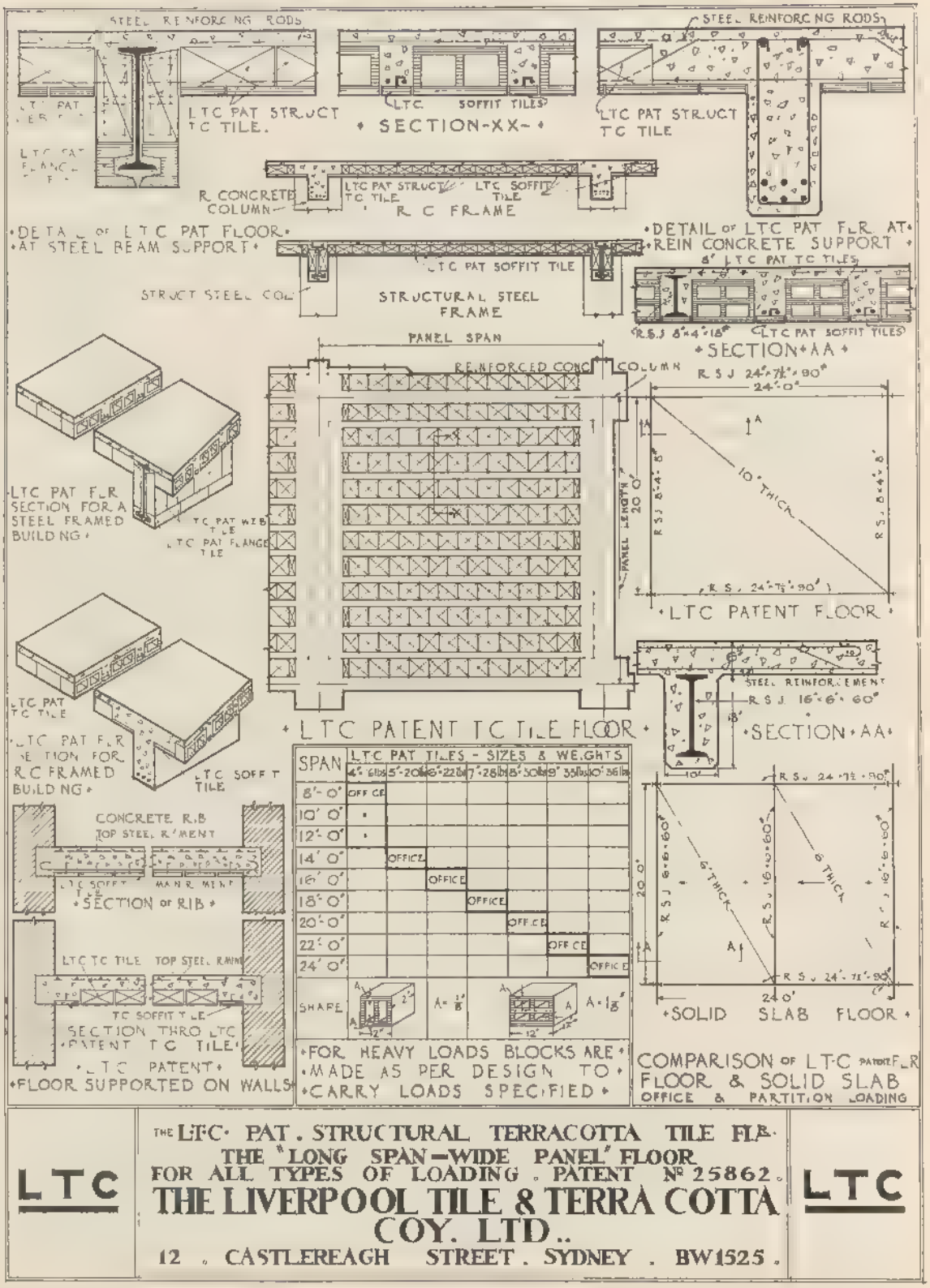

LTC

THE LTC PAT. STRUCTURAL TERRACOTTA TILE FLR.
THE "LONG SPAN—WIDE PANEL" FLOOR
FOR ALL TYPES OF LOADING . PATENT Nº 25862.
THE LIVERPOOL TILE & TERRA COTTA COY. LTD..
12 . CASTLEREAGH STREET . SYDNEY . BW1525 .

LTC

(Drawn by the Architectural Staff of Ramsay's Catalogue)

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PARTITION and FLOOR BLOCKS

MAXWELL PORTER & SON LTD.

107 REDFERN ST., WATERLOO, N.S.W.

TELEPHONE: M 3157

10a&b

S.A.A. File No.

[For Other Products, See Index]

Products and Manufacture

Structural Hollow Terra Cotta Partition Blocks and Floor Blocks for Fireproof Floor Construction

All products are formed from special clay, the clay is mined and moulded into scientifically designed shapes that give maximum durability and strength with a minimum of weight. After being dried, these shapes are placed in kilns and exposed to a temperature of 2,000 degs. F., which produces a permanently fire-resisting product that will never warp, disintegrate, or be affected by heat, cold or dampness.

Terra Cotta Partition Blocks

In addition to the fire resistance provided by Maxwell Porter's Partition Blocks, the high insulating and sound deadening qualities obtained by reason of their hollow structure is of much importance and when built up into partitions they form comparatively dead air cells which are virtually proof against the transmission of heat, cold and sound.

They are light, strong, easily handled by bricklayers, and will not contract and expand, or discolour brickwork. The exposed faces are grooved for plaster.

STANDARD SIZES

Thickness of Blocks Ins. (see Fig. 1)	Weight per Block Lbs. (Approx.)	For partition heights up to Feet
2½	17	Generally use for furring
[illegible]	13	1
4	16	16
6	2[illegible]	2[illegible]

Special thicknesses up to 9 ins. can be supplied if desired.

ERECTION NOTES

Partitions should be bonded where meeting. Rough wooden frames 1½ in. wider than thickness of partition should be placed in door openings, anchored every second course, and acts as grounds for finished plaster. Blocks forming lintels up to 6 ft. wide can be filled with concrete and reinforced with steel rods. Blocks of jamb at openings 4 to 6 ft. wide should be set with the cells vertical and filled with concrete.

Partitions abutting brick or concrete walls are anchored with metal ties every second course. Furring is similarly anchored with the ties spaced 1 to every 3 blocks horizontally.

Blocks are set in full beds of cement mortar to which hydrated lime may be added.

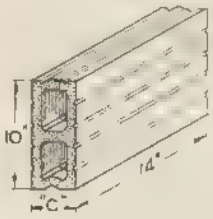


Fig. 1

Terra Cotta Floor Blocks

(FOR FIREPROOF FLOOR CONSTRUCTION)

These Terra Cotta Blocks are particularly adapted to all classes of buildings where long span fireproof floors are needed without the beams showing in the ceilings. The blocks effect permanent forms into which is poured the concrete, producing a series of connected concrete ribs. This construction reduces the dead load, eliminates all formwork, except the soffit timbers required for the bearing of blocks at each rib (see drawing), and provides positive fire resistance.

Each adjacent block is in contact with the other in a line of units. They are not disturbed whilst pouring the concrete and need no re-alignment; consequently, when the concrete is poured, the whole forms a monolithic construction.

Maxwell Porter's Floor Blocks incorporated in the above construction ensure a floor with extraordinarily high qualities in the resistance to the transmission of sound, heat and cold. The blocks are suitable for floor constructions with varied loads and for spans up to 28 ft.

STANDARD SIZES
(See Figs. 2 and 3)

Thickness (Ins.)	7	8	9	10
Weight per Block Lbs.	26	29	32	35

Thickness (Ins.)	4	5	6
Weight per Block Lbs.	16	19	22

Note: Special Units for fireproof steel beams [illegible] can be supplied if desired.

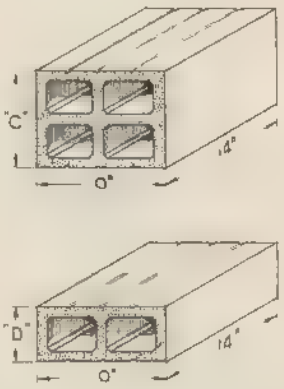
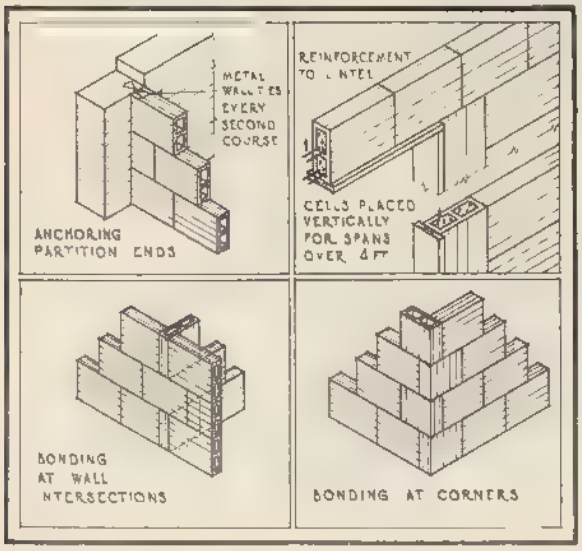
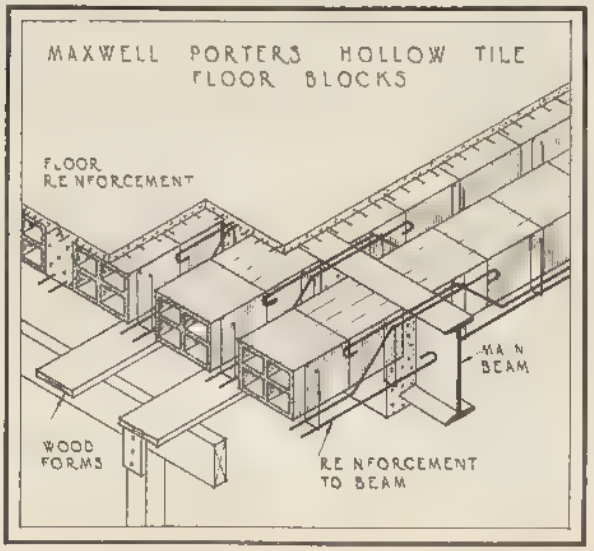


Fig. 2 and 3





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10 *a & b*

S.A.A. File No.

PERMASITE FLOORING & PARTITION CO.
PTY. LTD.

259 STURT STREET, SOUTH MELBOURNE

Telephone, M 2658

PERMASITE

[For other Products, see Index]

PERMASITE CELLULAR BASALT HOLLOW FLOOR BLOCKS
Patent No. 15-325

This material—cellular basalt—is volcanic in origin and having been in ages past subject to intense heat, it was at a later stage erupted and finally, through the escaping of steam, has been reduced to a porous state. Thus we have been provided by nature with an ideal aggregate for concrete products—light weight, fireproof and non-organic. It is this material, with the addition of Portland Cement, that is moulded into Permasite products.

Permasite floor blocks, made from this material, are used for one-way and two-way floor systems, adaptable for all classes of buildings where long-span, fireproof floors are required without the beams showing in the ceiling. Permasite blocks, in combination with the concrete filler beams, reduces the dead load and provides a clear horizontal plastering surface. The blocks make permanent forms in which are cast the secondary beams, thus reducing the need of expensive formwork. By using Permasite floor blocks, any kind of rendering or plastering may be used. The use is not restricted to any one particular brand of plaster.

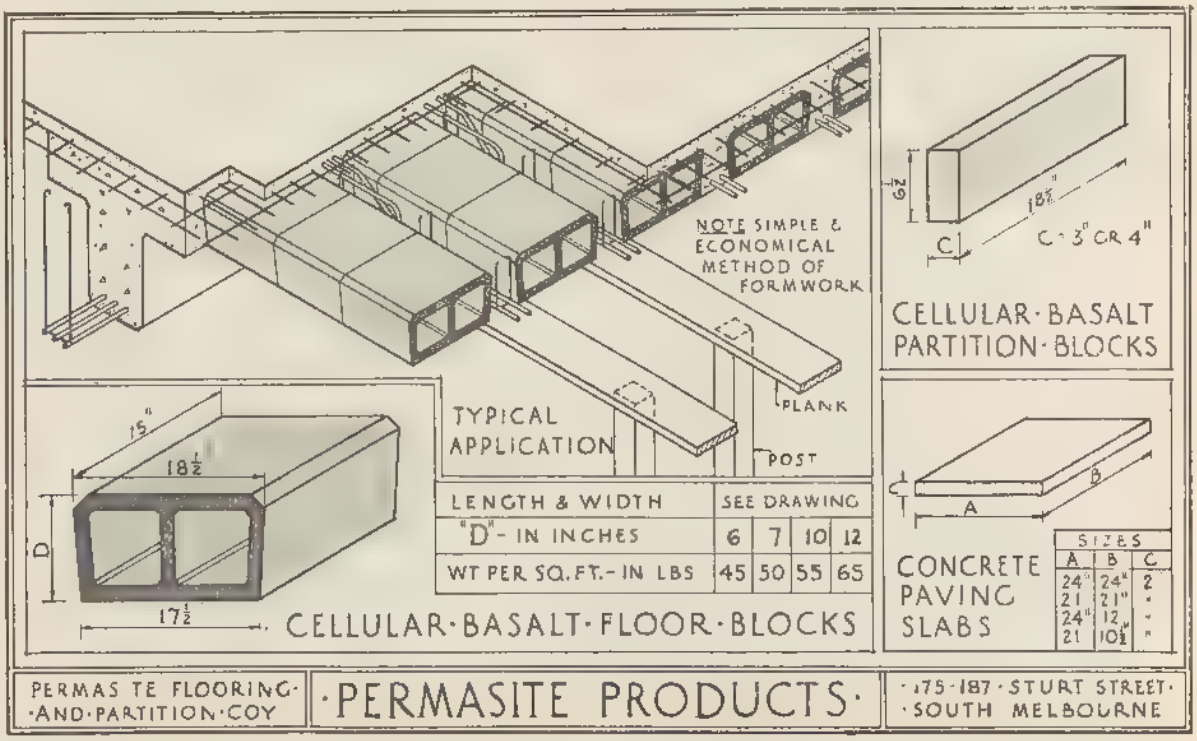
[Both the Fire Underwriter's Association and the Melbourne City Council approve of Permasite Blocks]

The blocks are made in steel moulds and therefore are true to shape, so that each adjacent block sits snug against its neighbour, and no cement is lost between the joints. Because of their rough cellular surface, they offer the best key for plaster. They can be placed in any kind of weather, as they are not affected by moisture. The concrete used in our blocks has the lowest heat conduction coefficient of any material used in hollow blocks, and are therefore ideal material for use in flat roofs, keeping the room cool in summer and warm in winter. So far, over 500,000 Permasite blocks have been used in Melbourne buildings.

The advantages of Permasite Cellular Hollow Floor Blocks are

1 Soundproof
2 Good insulation with regard to both heat and cold.
3—Level ceiling, having no secondary beams projecting great advantage with respect to light
4—Ease of erection and avoidance of costly timbering
5—Economical in design with respect to the amount of steel reinforcement and concrete
6—Saving in cost of plastering of ceiling, as there are no secondary beams projecting. Permasite blocks have the best key of any block for plastering
7—The ducts in the blocks can be used for ventilating purposes, and also for carrying conduits
8—Vermin-proof.
9—Comply with the Melbourne City Council and Fire Underwriters' Association regulations for fire-resisting construction.
10 Do not alter shape during or after manufacture
11—Unaffected by moisture.

Further particulars of this efficient floor block will be gladly supplied on request



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VICTOR

AND WARATAH HIGH-GRADE PLASTER AND VICTOR-GYPSUM PRODUCTS

Cable and Telegraphic Address:
"Plaster" Melbourne; "Plasco" Sydney; "Plaster" Brisbane

AUSTRALIAN GYPSUM PRODUCTS PTY. LTD

AGENTS AND SUPPLIERS FOR VICTOR ELECTRIC PLASTER MILLS PTY. LTD., AUSTRALIAN GYPSUM LTD., AND PENINSULA PLASTER CO PTY. LTD.
MELBOURNE — SYDNEY — BRISBANE

Head Office:
LORIMER STREET, SOUTH WHARF, SOUTH MELBOURNE, S.C.5.
Phones: M 2431, M 3602.

Sydney Office: No. 15 Wharf, Pyrmont, N.S.W. Phone: MW 1067

Brisbane Office, National Mutual Building, 295 Queen St., Brisbane, Queensland. Phone: B.3805

And at Newcastle and New Zealand

21 a

S.A.A. File No

SPECIFICATIONS AND DATA ON THE USE OF

VICTOR
HIGH-GRADE PLASTERS
AND
VICTOR HARD FINISH

VICTOR
GYPSUM PARTITIONS
AND
HOLLOW FLOOR BLOCKS

Products

- Victor and Waratah High-grade Plaster
- Victor Sanded Plaster (prepared)
- Victor Hard Finish
- Victor Hardwall Setting (prepared)
- Victor Cement Plaster
- Victor (FFF) Dental Plaster
- Victor Patching Plaster.
- Victor Acoustic Plaster
- Victortex
- Insulex
- Victor-Gypsum Partition Blocks
- Victor Gypsum Hollow Floor Blocks (Innes-Bell Systems)

Facilities

Australian Gypsum Products Pty. Ltd rank as Pioneers of the Gypsum Industry, having gypsum mines located in various centres of the Commonwealth and Mills equipped with the most modern machinery for the manufacture of the well-known Victor and Waratah brands of high-grade plaster, and Victor-Gypsum products, incorporating the Innes-Bell patented systems of Gypsum Hollow Floor Blocks.

The Mines and Mills, electrically operated, have a capacity output capable of meeting the total requirements of the Commonwealth and New Zealand, and provision has also been made for an immediate increase in output at any future date.

Manchester Unity Building, Collins St., Melbourne.

Architects: Marcus R. Barlow, A.R.A.I.A. Builders: Walter E. Cooper Pty. Ltd. Victor-Gypsum Partition Blocks were used throughout the Corridors and Dividing Walls.

Gypsum -Insulation Lightweight

Gypsum, with its close-knit air confining cells, has the highest insulating value of any fire-resisting cementitious structural building material.

It thus combines insulation and strength in one homogeneous substance. Present-day efficiency demands a non combustible material which conserves heat in winter and maintains cool working conditions even in the hottest summer weather. Victor-Gypsum meets this demand at a minimum cost.

Gypsum is the lightest of the structural building materials, having approximately 40 per cent. of the weight of concrete.

Where used structually in floor and partition blocks, the light weight of gypsum, combined with strength, reflects decided economies in all supporting members, including savings which frequently amount to large sums when freight or railage, haulage, hoisting and erection, also interest on the investment is carefully considered.

Special features of the large organisation of A.G.P. are the research laboratories where regular tests of all raw materials used in manufacture, also products ready for despatch, are made in order to conform to Standard requirements, and a guarantee of the manufactures bearing the registered trade name, VICTOR, Reg. No. 7759, and Letters Patent numbers.

Complete control of operations from the Mines to the finished products for the building is made possible by close co-ordination in all branches of A.G.P., thus assuring maximum satisfaction to Architects, Engineers, Builders and others.

State Analyst's reports, available for perusal, show Victor Gypsum to be of high analysis and uniform run, and comparable with the best grade gypsum from any part of the world.

Non-Conductor of Sound

Victor-Gypsum Partition Blocks are excellent non-conductors of sound, and are recommended for use in hotels, office buildings, schools, apartment houses and all buildings where soundproof partitions are of importance. Authentic tests show that less than one hundredth of one per cent. of incident sound is transmitted through a gypsum block partition plastered with gypsum plaster.

Service and Literature

Information and all data will be gladly supplied to Architects, Engineers, Builders, and others interested in the use of Victor-Gypsum Hollow Blocks and the Innes-Bell Systems of Floor Construction, on communicating with Australian Gypsum Products Pty. Ltd., at their Head Office, Lorimer Street, South Wharf, South Melbourne, S.C.5. ('Phones M.2431, M.3602), or any of their Interstate or N.Z. Offices.

(Continued on next page)

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

Victor and Waratah High-grade Plasters

For use in all general and fibrous plaster work. Unequalled for strength, uniformity and purity

Victor Sanded Plaster

A prepared rendering or floating material consisting of a gypsum plaster base and clean sharp sand, correctly graded and proportioned

Saves considerable time and assures accurate gauges.

Desirable in localities where good sand is not available Has no tendency to shrinking and cracking. Will adhere to any surface, eliminating "drumminess." Spreads quickly and easily being plastic and fatty Sets in a few hours, enabling the next coat to be proceeded with without wasting time May be used to produce a sand float finish if desired.

Victor Hard Finish

The most sanitary finishing hardwall plaster manufactured Produces a hard surface like Keene's Cement. May be papered or painted as soon as it is dry. Has no tendency to shrinking and cracking. Will adhere to any surface. Contains no vegetable or organic matter to decompose. Produces a surface as water resisting as is procurable with a gypsum plaster base.

Victor Hardwall Setting

Victor Hardwall Setting is a prepared setting coat, clean water only having to be added. Used as finishing plaster and assures a good white wall which will not crack or shrink. Fully prepared and ready for use. When painting or papering of wall is required, use Victor Hard Finish

Victor Cement Plaster

Victor Cement Plaster requires addition of sand only and is economical on large jobs, and particularly country centres, where a good, clean, sharp sand is available Supplied containing the fibre or left unfibred for rendering or floating coats over wood lath, concrete, brick, tile or Victor-Gypsum Block surfaces

Victor Acoustic Plaster

Victor Acoustic Plaster is a specially prepared gypsum plaster for acoustical correction Literature containing further information and directions for use is available on application

Victortex

Victortex is a decorative plaster finish ready for use with the addition of water only. It is used as a finish coat over the regular base coats of plaster Further information and specifications are available on request.

Insulex

Insulex is a prepared fluffy Gypsum product, possessing a high insulating value Insulex will not burn nor decompose, and will not harbor vermin

It is used for insulation against heat and cold in frame buildings, as floor fill, and as a sound deadener in ceilings and partitions

ARCHITECT'S SPECIFICATIONS FOR USE OF VICTOR PLASTER

MATERIALS.

(1) PLASTERS

All plasters shall be the following as manufactured by Australian Gypsum Products Pty. Ltd :—

Plaster for Rendering and Floating Coats.—(1) Victor Sanded Plaster, or (2) Victor Cement Plaster.

Plaster for Setting Coats.—(1) Victor Hard Finish, or (2) Victor Hardwall Setting.

Note. Strike out those not desired.

(2) SAND

Sand shall be clean, sharp, and free from loam, clay, salt, vegetable matter, or other impurities.

(3) LIME

Lime for lime putty, when specified, to be mixed with Victor Hard Finish, shall be fresh burned, carefully sieved, and perfectly slaked before use.

(4) WATER

Water shall be fresh and clean, free from any impurities.

(5) METAL LATHING

Metal lathing shall be of an approved brand (or specify a particular brand), fixed with galvanized staples every 18 in. to framing.

(6) WOOD LATHS

Wood laths shall be of 1 in. sawn oregon, spaced ¼ in. apart, and well nailed with galvanized lath nails to each bearing.

WORKMANSHIP.

(7) GENERAL

The whole of the work is to be executed to the entire satisfaction of the Architect.

The Contractor shall provide and erect all scaffolding, staging, etc., and provide all tools necessary for the proper execution of the work.

Mixing boxes shall be clean and watertight.

Tools shall be kept clean and must not be rinsed in the gauging water.

All plasters shall be stored in a dry place raised above the ground level.

(8) MIXING

No more material than that which can be applied in approximately one hour shall be mixed at the one time.

Plaster, after it has commenced to set, shall not be re-tempered.

When sand and Victor Cement Plaster are to be mixed together, the two materials shall be mixed thoroughly dry before adding water.

Lime Putty and Victor Hard Finish shall be thoroughly and uniformly mixed to the proper consistency.

(9) BASE (RENDERING AND FLOATING COATS). PLASTER ON WOOD LATH

I Using Victor Sanded Plaster.

(a) First (rendering) and Second (floating) coats shall consist of Victor Sanded Plaster (to which fibre shall be added) and then properly mixed with water.

(b) Wood laths shall be thoroughly wetted before first fibred coat is applied, which shall be applied with sufficient pressure to fill the spaces between lathing to obtain a good key. This coat shall be scratched to form a bond for the second coat.

(c) Second coat shall be applied when the first coat is set, but before it is dry. It shall be applied with strong pressure and screeded to a true level plane ready to receive finish (setting) coat.

II. Using Victor Cement Plaster.

(a1) First (rendering) coat shall consist of one part Victor Cement Plaster, fibred, with two parts, by weight, of dry sand.

(b1) Second (floating) coat shall consist of one part of Victor Cement Plaster, fibred, to three parts, by weight, of dry sand.

(c1) Use paragraph (b).

(d1) Use paragraph (c).

(10) BASE (RENDERING AND FLOATING COATS). PLASTER ON METAL LATH

I Using Victor Sanded Plaster.

(a2) Use paragraph (a) above for Wood Lath.

(b2) First coat shall be applied with sufficient pressure to fill all the meshes and obtain a good key This coat shall be scratched to form a bond for second coat.

(c2) Use paragraph (c) above for Wood Lath.

II. Using Victor Cement Plaster

(a3) Use paragraph (a1).

(b3) Use paragraph (b1)

(c3) Use paragraph (b2).

(d3) Use paragraph (c).

(11) BASE PLASTER ON MASONRY.

I Using Victor Sanded Plaster.

(a4) Base coat plaster shall consist of Victor Sanded Plaster properly mixed with water.

(b4) The surfaces of brick, tile, or Victor-Gypsum block walls shall be thoroughly wetted before plastering, when necessary, to overcome excessive suction. The plaster shall be applied to fill out to grounds and, before drying, it shall be broomed to receive the later specified finish coat.

II. Using Victor Cement Plaster.

(a5) Base coat plaster shall consist of one part of Victor Cement Plaster and three parts, by weight, of dry sand.

(b5) Use paragraph (b4).

(12) BASE PLASTER ON CONCRETE

(a6) Concrete surfaces to be plastered shall have all dust and loose particles brushed from the surface, which shall then be washed with clean water. Exceptionally smooth surfaces shall be roughened to form a background for the plaster.

Note.—Base Coat Plaster as specified in paragraphs (a4) or (a5) can now be applied in a similar manner to that specified in paragraph (b4)

(13) SMOOTH WHITE FINISHING COAT

Note.—Victor Hard Finish and Hardwall Setting Plasters can be used on any cement or lime plaster base.

I Using Victor Hard Finish.

(a7) The Finishing (setting) Coat shall consist of three measures of Victor Hard Finish to one of lime putty

Ordinary Setting—Gauge one of Victor Hard Finish to one of lime putty.

Special Note.—When used to take the place of Keen's Cement, or to be immediately papered or painted, specify Victor Hard Finish to be used pure without the addition of lime

(b7) The Finishing Coat shall be applied when the base coat is set firm and nearly dry. The base coat shall be sprinkled with water and the finishing coat applied by first skimming with float, taking care that skimming coat is rubbed very tightly into base coat to ensure perfect cohesion The finishing coat shall then be completed by laying with trowel to a true level and plumb surface, free from trowel marks and blotches.

II. Using Victor Hardwall Setting.

(a8) The Finishing Coat shall consist of Victor Hardwall Setting Plaster mixed to the proper consistency with clean water only.

Special Note.—On no account add Lime Putty.

(b8) Use paragraph (b7) above.

(Continued on next page)

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VICTOR-GYPSUM PARTITION BLOCKS

Method of Laying

It is recommended that Victor Sanded Plaster or Victor Unfibred Cement Plaster be used in laying Victor Gypsum Partition Blocks. Victor Sanded Plaster, having a base of gypsum plaster to which is already added clean, sharp sand, proportionately mixed, and requiring only the addition of water, makes a perfect bond, and ensures speed, and economy in the elimination of time and labour spent in mixing other mortars on the job. **Complete specification is given below.**

If 3 in blocks are to be built in between timber floors, a 4 in x 3 in oregon top and bottom plate may be fixed to joists and the 3 in. Victor Gypsum Block partitions be built in between these plates. By having these plates 4 in wide they act as grounds and bring the ½ in of Victor Sanded Plaster and Setting on both sides of the partition flush with the face of the plates.

Wood oregon cores may be inserted in the hollow Gypsum Blocks at the top of skirting level and at the picture rail level.

APPROX. WEIGHTS AND THICKNESSES OF VICTOR-GYPSUM 30 x 12in. PARTITION BLOCKS

Thickness inches.	For Ceiling Heights up to feet.	Wt. Block per sq ft. lbs.	Wt. Mortar per sq. ft. lbs.	Weight Plaster, one side per sq. ft., lb., ⅜in. grounds.	Weight Plaster, two sides per sq. ft., lb., ⅜in. grounds.
hollow	13	9.1	2	3	6
"	17	12	[illegible]	3	6
"	30	16.6	3	3	6
"	40	22.4	4	3	6
solid	10	9	1.5	3	—

Preparing a Section of Offices with Victor-Gypsum Partitions. Note Perfect Base for Floating and Finishing Coats.

SAVING IN WEIGHT

As illustrating the saving in weight effected by the use of Victor Gypsum, the following figures show an approximate comparison for 3 in partition walls.

Victor-Gypsum Blocks.	Quantity per Sq. Yd. [illegible]	App. Wt. [illegible]
Lumber Partitions	18 to Sq. Yd.	162 lbs.
Bricks on edge	36 to Sq. Yd.	315 lbs.

ARCHITECT'S SPECIFICATION FOR VICTOR GYPSUM PARTITION BLOCKS

(A) MATERIALS

(1) PARTITION BLOCKS

All non-bearing partitions, furring, vent shafts and other special partition work noted in the specifications shall be erected with Victor-Gypsum Partition Blocks as manufactured by Australian Gypsum Products Pty. Ltd. Blocks shall be of the thickness and type indicated on drawings (or as set out in the Schedule of Partition Work).

(2) MORTAR

Victor-Gypsum Partition Blocks shall be laid with mortar consisting of (a) Victor Sanded Plaster, or (b) two parts of unfibred Victor Cement Plaster to three parts of clean, sharp sand, by measurement, thoroughly mixed with fresh water. Do not mix more than can be easily applied in an hour.

Note.—Portland Cement Mortar may be used.

(3) ANCHORS AND TIES

Note.—This paragraph to be included in "Concretor" or "Bricklayer."

Metal anchors used for anchoring Victor-Gypsum Partition Blocks to brick (or concrete) walls shall be an approved type, and shall be accurately built into walls as follows:—(1) Anchors for furring partitions shall be spaced one for each square yard. (2) Anchors for tieing ends of partitions to walls shall be spaced 12 in. apart on centres, ready for building in to the courses of Gypsum blocks when erected.

(4) REINFORCING RODS

Note. Include this paragraph in "Structural Steel."

Reinforcement of Victor-Gypsum Partition Block lintels spanning openings 4 to 6 ft. wide shall consist of No. 4 ⅜-in. mild steel bars to each lintel. Bars shall be at least 12 in longer than actual width of opening.

(B) WORKMANSHIP.

(5) ERECTION

All Victor-Gypsum Partition Blocks shall be laid with the mortar previously specified. Partitions shall start at the floor with a mortar bed, and shall be laid plumb and true with full flush joints, with horizontal beds consistently level at each course. Vertical joints shall be broken and the partitions shall be wedged at the ceilings and flushed with mortar. Corners and intersections shall be built by interlocking the blocks of alternate courses.

(6) FURRING, ETC.

Furring, where indicated on drawings, shall be securely anchored to brick or concrete walls every square yard with metal ties or straps left in place by the "Bricklayer" or "Concretor." The ends of partitions abutting brick or concrete walls shall be similarly secured, the anchors being spaced one to each course of Victor-Gypsum Partition Blocks.

(7) LINTELS

Openings in partition walls shall be spanned as follows:

(I) Openings 22 in. wide or less shall be spanned with a single Victor-Gypsum Block, having a bearing of not less than 4 in. at each end.

(II) Openings between 22 in. and 48 in. wide shall be spanned with Victor-Gypsum Blocks sawn to form centre key blocks and skew-backs at each bearing and in the form of a flat arch with a bearing of at least 6 in. at each end.

(III) Openings over 4 feet, but not greater than 6 feet, shall be spanned with Victor-Gypsum Blocks solidly filled with Victor Sanded Plaster or Victor Cement Plaster and reinforced with steel bars as described in "Structural Steel." Bearings at each end shall not be less than 6 in.

(IV)—An alternative for II and III.—Openings shall be spanned with approved pre-cast lintels, having a width of the full thickness of the partition and a depth of 1 ft., and a bearing of at least 6 in. at each end.

Note. For spans greater than 6 ft., specify under "Structural Steel," metal lintels of an approved type, having a 9 in. bearing at each end.

(8) ROUGH WOOD FRAMES.

Note.—This and the following paragraph are to be included in "Carpenter."

Frame and erect rough wood frames for door openings in Victor-Gypsum Partition walls in advance of those erecting partitions. The frames shall be 2 in. thick and have a depth equal to the thickness of the block, and shall have ⅞ x ½ in. grounds nailed to both sides of frame to door height in order to form a pocket to receive ends of partition blocks. Secure approved metal ties to frames, ready for building in to partitions when erected.

Note that the above-mentioned grounds may also form the fixing for finished wood architraves.

(9) NAILING STRIPS FOR JOINERY GROUNDS

(I) Nailing strips of ⅞ in. thickness and of such other dimensions to cover the end of block shall be nailed to end of each Victor-Gypsum Block to form fixing for all wood grounds to receive skirtings, picture rails, etc.; or

(II) 2 in. x 1½ in. sections of oregon shall be inserted in the Victor-Gypsum Block cores at the desired positions to provide fixing for joinery grounds.

Note.—Lavatory basin brackets and other supports for heavy fixtures are best secured to partitions by bolting through blocks as shown on detailed drawing.

(10) PLASTERING.

Note.—Plastering on Victor-Gypsum Partition Blocks should be carried out in accordance with the recommended specifications given on page 62.

(Continued on next page)

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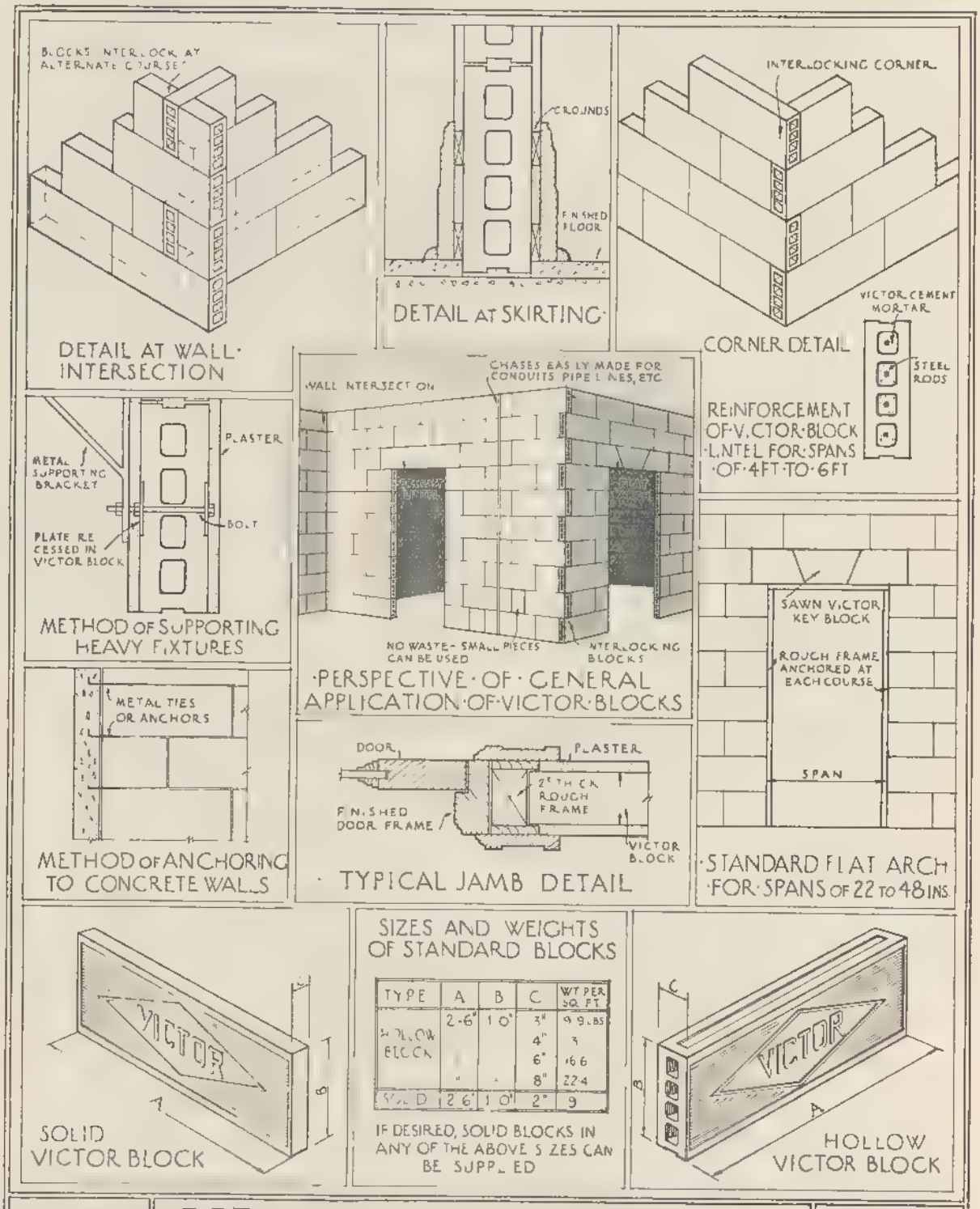

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VICTOR-GYPSUM HOLLOW FLOOR BLOCKS

FOR

"INNES-BELL" FIREPROOF FLOOR CONSTRUCTION

The method of building known as the "Innes-Bell" System, which includes the use of tapered end blocks, is protected by the Patent No. 12151/1923, and any unauthorised use of the system will be rigorously contested

Victor-Gypsum Hollow Floor Blocks are the best and most modern obtainable They are manufactured in one piece for use in connection with the patented "Innes-Bell" Two-way Flat Slab System, the One-way Rib System, also the Square Slab System.

The Victor Gypsum Hollow Floor Block has also been patented in respect of all shapes and sizes (Letters Patent 11170/28). Legal proceedings will be taken against any unauthorised maker or user of such Blocks.

These Blocks and Systems of construction are extensively used by leading Architects, Engineers and Builders throughout the Commonwealth and New Zealand

1 FIRE RESISTANCE.

The superior qualities of Gypsum as a building material possessing remarkable fire proofing properties have been definitely established by numerous tests carried out by such institutions as the Underwriters' Laboratories Inc., the U.S. Bureau of Standards, the British Fire Prevention Committee, etc. Local tests have been conducted by the Metropolitan Fire Brigades Board in compliance with requirements of Fire Underwriters, City Council and other building authorities.

Victor-Gypsum Hollow Floor Blocks showing one-way system and tapered end blocks in foreground Two-way blocks seen in background

2 SOUND AND HEAT INSULATION

Both sound and heat insulating properties are possessed to a large degree by Victor-Gypsum Hollow Blocks Floor and roof slabs in which they are incorporated have exceptionally high insulating values.

3 STRENGTH AND FREEDOM FROM BREAKAGE

Victor-Gypsum Hollow Blocks, being thoroughly reinforced, are strong and tough. They are not easily damaged during handling or building operations, and this freedom from breakage assures true seating of blocks on the jobs, together with even soffits

4 CLOSED ENDS

Victor-Gypsum Hollow Blocks are totally enclosed one-piece blocks, ensuring perfect joints where butted together, and obviating the necessity for special blocks to terminate the rows. The introduction of Cross Ribs, so desirable in one-way rib-construction, is also facilitated.

Open-ended floor blocks frequently leave gaping joints in soffits of slabs which the plasterer has difficulty in making good, and, by reason of their rough ends and imperfect joints, permit considerable loss of concrete into the interior of the blocks. This results in an increase in dead load to an unknown extent and an increase in building costs of an amount which cannot be predetermined

By the use of these one-piece closed-end blocks, Architects and Engineers are assured of having a perfect hollow-block floor and the Builder is guaranteed against loss of concrete. The numerous advantages gained by the use of Victor-Gypsum One-piece Blocks are immediately evident

5 WIDE RANGE OF SIZES

Victor Gypsum Hollow Blocks are available in any height from 4 in. to 14 in. The widths and lengths may be varied from the customary 24 in. x 24 in. two way or the 30 in x 18 in., and 30 in. x 24 in wide one-way blocks, this latter size being strongly recommended for economy.

TAPERED BLOCKS (see photo on this page) are procurable to provide increased concrete area near rib supports for resisting shear and negative bending stresses, and stirrups are frequently eliminated by their use. When used in conjunction with steel construction or with concrete beams not requiring flanges, the blocks may be extended right up to the beam sides.

6 UNIFORM SHAPES

Accurate uniform shapes and an absolute freedom from warping are ensured by the method of manufacture. True clean soffits and an excellent key for plastering are provided

These one-piece Hollow Blocks can be readily and cleanly sawn a great convenience in placing conduits, junction boxes, etc., for wiring purposes, permitting them to be easily flushed into ceiling

7 SAVINGS AND ADVANTAGES (See Next Page).

Considerable savings are effected by the use of Victor-Gypsum Hollow Floor Blocks in—

(a) Railage or freight.
(b) Handling and hoisting.
(c) Freedom from breakage.
(d) Guarantee from loss of concrete.
(e) Economy of plastering materials.
(f) Floor, column, and footing construction owing to lightness of blocks

(Continued on next page)

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VICTOR-GYPSUM HOLLOW FLOOR BLOCKS
FOR
"INNES-BELL" FIREPROOF FLOOR CONSTRUCTION

"INNES-BELL" TWO-WAY FLAT SLAB SYSTEM

(Patent No. 12,151)

(See Fig. A—Page 67)

Advantages.

1. **LONG SPANS** of up to 40 feet obtainable at minimum cost
2. **RAPID CONSTRUCTION** is a feature of this system.
3. **CLEAN, SMOOTH CEILINGS,** unbroken by projecting beams, ensure ideal distribution of light and perfect ventilation. No dead air pockets exist
4. **STRENGTH AND RIGIDITY.** The network of ribs in two directions renders this system ideal for supporting heavy concentrated loads. Resistance to deflection is much greater than that of ordinary flat slab floors
5. **INSULATION** against sound and heat is ensured by the use of Victor-Gypsum Hollow Blocks.
6. **FORMWORK** is greatly simplified and reduced in cost, as a flat decking only is required; timber after stripping has a high salvage value, there being no wastage from cutting to short lengths. The open system of timbering may be employed if preferred
7. **STRIPPING COSTS** are minimised, as sheeting drops away from ceiling upon removal of temming, and is ready for re-use.
8. **REINFORCING STEEL** is considerably reduced in quantity and simplified. Long rods and stirrups are usually eliminated and cranking of rods is avoided The arrangement of steel in ribs simplifies supervision, the omission of any rod being instantly detected
9. **COLUMN CAPITALS** may be omitted if desired for lightly loaded floors of moderate span, e.g., in office or domestic type buildings.
10. **HEADROOM** is unobstructed by beams, hence storey heights may frequently be reduced.
11. **MECHANICAL EQUIPMENT,** overhead runways, shafting, piping, etc., are attached more easily and simplified owing to the absence of beams, and the number of sprinkler heads is reduced
12. **STRUCTURAL STEEL COLUMNS** may be used in conjunction with these floors, simple, inexpensive brackets only being required.
13. **OPENINGS** in floors may be trimmed effectively by omitting hollow blocks where necessary to form beams contained within the depth of floor.
14. **SAVINGS are effected in Concrete, Steel, Formwork, Stripping and Plastering Costs, and there is A GREAT REDUCTION IN TIME OF CONSTRUCTION.**

"INNES-BELL" ONE-WAY RIB SYSTEM

(See Fig. B—Page 67)

Advantages Over Ordinary Beam and Girder Construction.

1. **SECONDARY BEAMS are ELIMINATED,** ceilings being unbroken except by main beams. Better lighting and ventilation is effected and subdivision by partitions is simplified. Costs of plastering and of sprinkler systems, etc., are reduced.
2. **INSULATION** against sound and heat is improved by the use of Victor-Gypsum Hollow Blocks.
3. **FORMWORK and STRIPPING COSTS** are reduced, The open system of timbering is recommended, one plank under each rib being sufficient
4. **REINFORCING STEEL** is simplified and reduced in amount.
5. **CROSS RIBS** (see Fig. B, page 67) are easily formed without special blocks, owing to the closed ends of the one-piece Victor-Gypsum Hollow Blocks, such Cross Ribs, in addition to increasing the rigidity of the floor, serve to distribute any concentrated load to the adjacent ribs. The comparatively shallow slab of beam and girder construction is not nearly so well adapted for carrying unforeseen concentrated loads as is the One-Way Rib System incorporating Cross Ribs
6. **STRONG ROOMS** and other heavy concentrations of loading may be provided for by the omission of a row of Hollow Blocks, thus, with suitable reinforcement forming a wide beam within the depth of the floor.

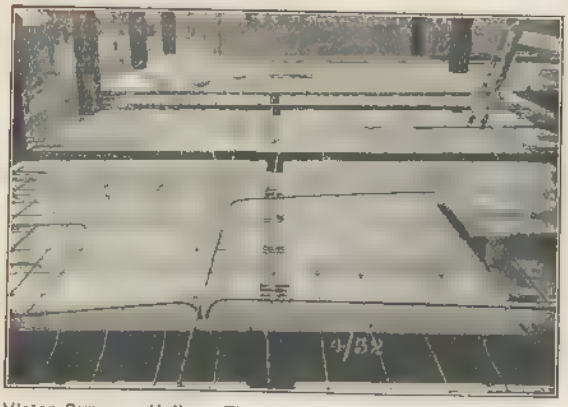
The One-Way Rib System, while providing the above advantages, generally costs no more than beam and girder construction, and frequently considerable savings are effected

"INNES-BELL" SQUARE SLAB SYSTEM

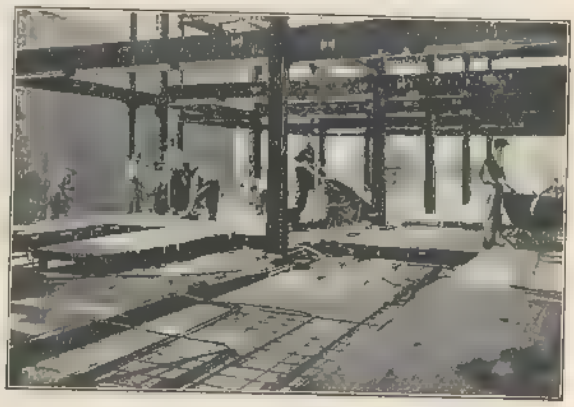
(See Fig. C—Page 67)

This system is distinctly economical, possessing all the advantages accruing from the use of One-piece Victor-Gypsum Hollow Blocks. Owing to the economical properties of the slab supported on four sides and the use of the Hollow Blocks, very large spans are possible at minimum cost. The supporting beams, being on column centres in two directions, are not excessive in section.

Where for architectural reasons beam effects are desired, as in the case of ceilings over banking chambers, insurance offices, etc., this system may be used to advantage. The bays, for economy, should be square, or nearly so.



Victor-Gypsum Hollow Floor Blocks previous to concreting. Note Stiffener Rib.



Another illustration showing concreting Victor-Gypsum Hollow Floor Blocks in the Shell Building, Brisbane.

(Continued on next page)

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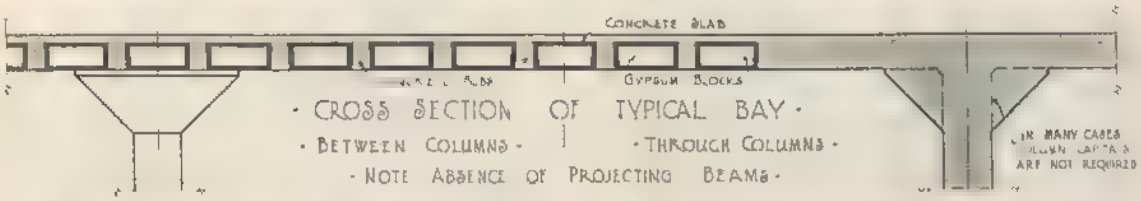
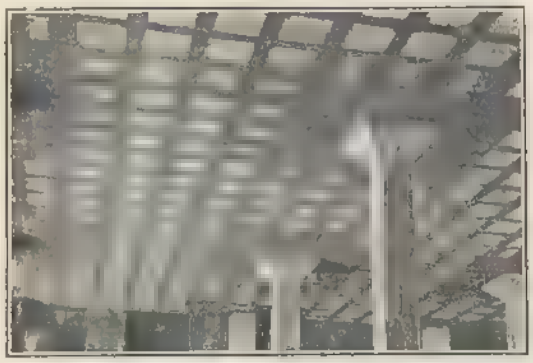
(A) "INNES-BELL" TWO-WAY FLAT SLAB SYSTEM
(PATENTED)



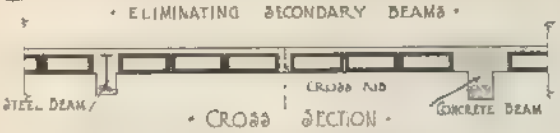
· CROSS SECTION OF TYPICAL BAY ·
· BETWEEN COLUMNS · · THROUGH COLUMNS ·
· NOTE ABSENCE OF PROJECTING BEAMS ·



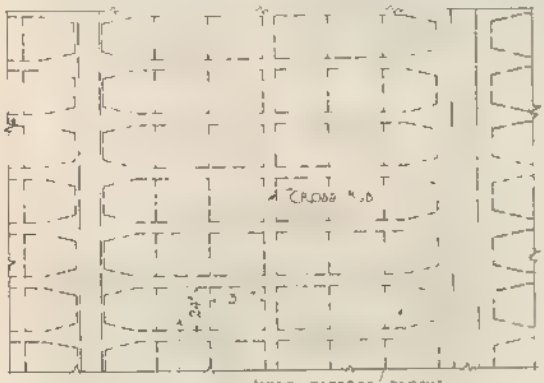
· CEILING AFTER REMOVAL OF FORMING ·
· SHEWING ARRANGEMENT OF HOLLOW BLOCKS ·

· CEILING AFTER APPLICATION ·
· OF PLASTER FINISH ·

(B) · ONE-WAY RIB SYSTEM ·
· ELIMINATING SECONDARY BEAMS ·



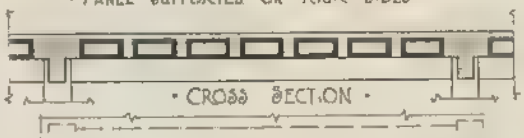
· CROSS SECTION ·



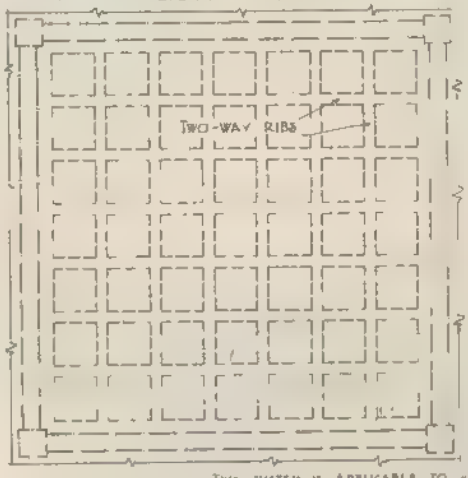
· PLAN · · NOTE TAPERED BLOCKS · · SEE LETTERPRESS

· BLOCKS TWO FEET WIDE ARE RECOMMENDED ·
· FOR ECONOMY ·

(C) · SQUARE SLAB SYSTEM ·
· PANEL SUPPORTED ON FOUR SIDES ·



· CROSS SECTION ·



· PLAN · · THIS SYSTEM IS APPLICABLE TO · · SQUARE OR NEARLY SQUARE PANELS ·

VICTOR-GYPSUM HOLLOW BLOCKS (PATENTED)

·FIREPROOF·FLOOR·CONSTRUCTION·
·AUSTRALIAN·GYPSUM·PRODUCTS·PTY·LTD·
·ALL STATES·AND NEW·ZEALAND·

INCORPORATING INNES-BELL SYSTEMS

The method of building known as the "Innes-Bell" System, which includes the use of tapered end blocks, is protected by the Patent No 12151 1923 and any unauthorised use of the system will be rigorously contested The Victor-Gypsum Hollow Floor Block has also been patented in respect of all shapes and sizes (Letters Patent 11170/28) Legal proceedings will be taken against any unauthorised maker or user of such Blocks.

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A FEW ILLUSTRATIONS SHOWING THE UTILITY OF

VICTOR-GYPSUM BLOCKS

Victor Gypsum Partition Blocks ready for Erecting in New Offices of the Vacuum Oil Co.

Showing Partition Walls prior to Floating and Finishing Plaster Coats. Note key block to arch, made by sawing the blocks

Representative Work

VICTORIA

Howey Court. Architect Marcus R. Barlow
Manchester Unity Building Architect: Marcus R. Barlow
G. J. Coles Stores Architect Harry A. Norris
Vaughan Building Architects Gawler & Drummond
Lucullus Ltd. Architects Blackett & Forster
Ivanhoe Grammar School. Architects P. B. Hudson, Wardrop & Usher
Crofts' Stores. Architects Alder & Lacey
Epworth Hospital Architect Alec S. Eggleston
Commercial Bank Architects Carleton & Carleton
Hotel Warrnambool Architects Thompson & Terry
Shell Building. Architects A. & K. Henderson
Herald Offices Architects H. W. & F. B. Tompkins.
Kodak Buildings Architect Philip B. Hudson.
Vacuum Oil Co's. Offices
State Electricity Commission. Architect A. R. La Gerche
Government Offices Architects Dept. of the Interior Works and Services Branch.
Titles Office Chief Architect
Additions to Queen Victoria Hospital. Architects Stephenson & Meldrum

SOUTH AUSTRALIA

Shell Building. Architects McMichael & Harris.
Hotel Ambassadors. Architects McMichael & Harris
Norwich Union Assurance Co., Office Block Architects Milne, Evans & Russell.
News Ltd. Architect C. W. Rutt.
St. Joseph's Providence. Architect L. Hodgson.

Showing One way Victor-Gypsum Floor Blocks ready for Floating and Partition Blocks being prepared for the Finishing Plaster Coat.

Representative Work

Barr Smith Library Architects Woods, Bagot, Joy & Laybourne Smith.
Additions to premises of Myer Emporium (S.A.) Ltd. Architects McMichael & Harris
Additions to premises of Chas. Birks & Co. Ltd. Architects McMichael & Harris
Clarksons Ltd. Factory. Architects P. R. Claridge in association with L. Gregory Bruer & N. C. Fisher
Adelaide Hospital. New Out-patients Block. Architect in chief
Adelaide Hospital. New Casualty Block. Architect in chief

N.S.W.

Government Buildings N.S.W. Government architect

QUEENSLAND

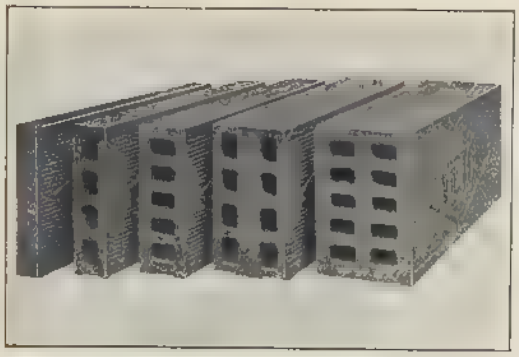
Shell Building. Architects Hall & Phillips
Valley Markets Architects Hall & Phillips.
Boonah Butter Factory Architects Hall & Phillips
A.M.P. Building Architects Hall & Cook
Burns Philp & Co. Bowen. Architects Atkinson & Conrad
Castlemaine Perkins Brewery Architects Addison & MacDonald
Bell Bros. Architects E. P. Trewern
James Bell Machinery Co. Architect E. P. Trewern
State Insurance Building Public Works Department
National Mutual Building

WESTERN AUSTRALIA

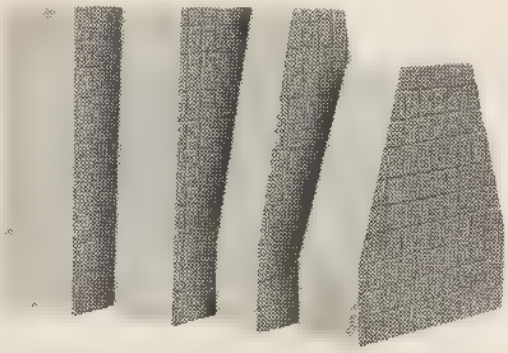
Shell Building Architects Hobbs Forbes & partners

TASMANIA

Extension to Hatton & Laws Building Launceston Architect A. H. Masters



Victor-Gypsum Partition Blocks were used in the Dividing Partition Walls of Manchester Unity Building and form the base in all the Corridors for Australian Tesselated Co's. Glazed Tiles.



Illustrating Victor-Gypsum Floor Blocks Hollow throughout—made in various sizes and thickness with an excellent key for cement rendering. Note Tapered Block.
(See letterpress, page 65)

VICTOR-GYPSUM PARTITION AND HOLLOW FLOOR BLOCKS MAY BE SAWN TO ANY SIZE

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SECTION D

[Containing S.S.A. Filing Section Nos. 7, 11, 24 & 28 i]

WATERPROOFING & DAMP-PROOFING
PAVING & PAVEMENT LIGHTS
FLOOR COVERINGS

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

7

S.A.A. File No.

NONPORITE PTY. LTD.

Manufacturers and Contractors

Tel. Haw. 1060

N.S.W.—McKINLAY, FLETCHER LTD., 189 CLARENCE STREET, SYDNEY
S.A.—ATKINS LIMITED, 55 PIRIE STREET, ADELAIDE
QUEENSLAND—MESSRS. WILLERS & HALLT, PERRY HOUSE, ELIZABETH STREET, BRISBANE

WATERPROOFING AND

PURPOSE	WHERE APPLIED	NAME OF PRODUCT	DESCRIPTION AND USES
CAULKING	Pointing	Nonporite Caulking Compound (all colours)	A permanently elastic, durable, coloured, waterproof compound for caulking, jointing, pointing window frames, floors and skylights, cracks and joints in brick, stone, terra cotta, etc.
WATER-PROOFING	Integral Concrete	Nonporite No. 3	An integral cement waterproofer in liquid form for damp-proofing, waterproofing, accelerating and hardening the cement work. Used for reservoirs, tanks, basements, damp courses, leaky walls, etc.
		Nonporite No. 2	A fine white highly water-repellant integral cement waterproofing powder for mixing with cement in concrete or mortar to make it permanently damp proof and waterproof. Specially recommended for electrolysis conditions.
	Plaster Coating and Brickwork Mortar	Nonporite No. 3	(See above)
		Nonporite No. 2	(See above)
	Surface Treatment	Nonporite No. 1 and 1A	No. 1, a transparent, No. 1A a colourless, waterproofing liquid for application, to the exterior of brick, stone, stucco or concrete walls, above grade. The waterproofing is absorbed into all the pores, filling them with inert water-repellant compounds.
		Nonporite Masonry Stain (all colours)	(See below)
		Nonporite Bituminous Mastic Paint and Cement)	A black, waterproofing and caulking compound for repairing roofs, damp proofing walls, stopping leaks, coating roofs, sealing cracks, etc. It consists of selected waterproofing bases and fibrous asbestos and is ready for immediate use. Applied cold. For iron, use the paint in brown or black.
COLOURING	Integral	Nonporite "Colourseal" (Standard Colours)	"Colourseal" is a colourant in paste form, for mixing with cement. Use for colouring, hardening, dust-proofing, and waterproofing concrete and cement surfaces.
		Nonporite Dry Colours (Standard Colours)	Dry Colours consists of selected, graded, mineral oxides which stain the mix without being deleterious to the cement.
	Surface	Nonporite Masonry Stain (all colours)	A waterproofing and decorating coating for exposed masonry surfaces such as concrete, brick, stucco, etc. Nonporite Masonry Stain penetrates into the pores, becoming an integral part of the surface and gives a clean, flat, uniform appearance, with but slight change of the surface texture.

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NONPORITE PTY. LTD.

294-296 Burwood Road, Hawthorn

E.2, Victoria

W.A.—HARRIS, SCARFE & SANDOVERS LTD., HAY STREET, PERTH
TAS.: LAUNCESTON—SALISBURY'S FOUNDRY CO. PTY. LTD., 33 CHARLES STREET
" HOBART—R. L. DITCHAM, ESQ., 54 COLLINS STREET

7

S.A.A. File No

PRESERVATIVE PRODUCTS

APPLICATION	COVERING CAPACITY	HOW TO SPECIFY [All Specification Clauses set out below shall be completed as follows "Strictly in accordance with the manufacturer's directions."]
Rake out joints clean and dry and apply the Caulking Compound with a caulking tool or trowel.	Where joints are wide, first ram with oakum, finally caulking up with Caulking Compound.	STEEL WINDOW FRAMES "shall be buttered with Nonporite Caulking Compound before being pressed into position." ALL WINDOW FRAMES "shall be caulked with Nonporite Caulking Compound in joint between frame and masonry." ARCHITECTURAL TERRA COTTA JOINTS "shall be pointed with Nonporite Caulking Compound to a depth of ⅜ in." CRACKS "shall be filled with Nonporite Caulking Compound within ¼ in. of surface and then pointed with cement mortar."
Use as a rule one quart of Nonporite No. 3 to each cubic foot (94 lbs.) bag of cement. (See detailed specifications.)	1½ gallons per cub. yard, in 1: 2: 4 mix.	NONPORITE No. 3 "shall be added to the water used in tempering the dry 4:2:1 concrete mix in the proportion of 1½ gallons to each cubic yard of concrete" (this corresponds to 1 quart to each 94 lbs. bag of cement)
Mix the dry powder with the cement and sand prior to the addition of the mixing water.	For average work, use 2-5 lbs. per cub. [illegible] bag of cement.	NONPORITE No. 2 "shall be used in the proportion of 2-5 per cent. by weight of cement in concrete or plaster."
(See above)	(See above) One gallon per 11 sq. yds., ¾-in. thick.	IN PLASTER COAT.—"All surfaces specified to be waterproofed shall have a finishing plaster coat composed of 1 part of Portland cement to 2½ parts of clean, sharp sand, tempered with water into which has been gauged 1 quart of Nonporite No. 3 to each 94 lbs. bag of cement" (this corresponds to 1 quart to each 11 square yards of plaster ¾ ins. thick). "Before application of the plaster coat the surface shall be thoroughly roughened and coated with a cement grout." IN BRICKWORK MORTAR.—"All brickwork mortar from foundations to four courses above grade shall be waterproofed by adding 1 gallon of Nonporite No. 3 to every 10 gallons of water used in tempering the dry mix (a 1 to 3 mortar is recommended) courses shall be ½ in. thick."
(See above)	(See above)	(See above)
To the clean, dry surface, apply not less than three coats of Nonporite No. 1 or 1A.	Varies inversely as the porosity of the surface. Average covering one gal. to 80 sq. ft., three coat work.	TRANSPARENT "Nonporite No. 1 shall be applied in three coats to a clean, firm, dry surface after filling all cracks with Nonporite Caulking Compound." COLOURLESS "Nonporite No. 1A shall be applied in three coats to a clean, firm, dry surface after filling all cracks with Nonporite Caulking Compound."
(See below)	(See below).	(See below)
Apply with brush or trowel according to the nature of the work. Use "AA" brand for acid and alkali work.	Cement, 33-100 sq. ft. per gal. Paint, 800 sq. ft. per gal.	NONPORITE BITUMINOUS MASTIC (Paint or Cement) "shall be applied in one (or two) coats to clean, firm, dry surfaces, ironwork shall first have all rust removed."
Dissolve the paste in water and then mix thoroughly with the cement and sand.	Use ½ gallon to each cub. ft. (94 lbs.) bag of cement.	NONPORITE COLOURSEAL "shall be added to the gauge water used in tempering the dry mix (plaster or concrete) in the proportion of ½ gallon to each 94 lb. paper bag of cement."
Mix 2-6 lbs. of Dry Colour to every 94 lb. bag of cement with the dry mix before adding water.	For intense colouring use 6 lbs. to every 94 lb. bag. For lighter tints use less.	(Refer to Manufacturers.)
[illegible] Masonry Stain by means of a brush or spray.	Varies inversely as the porosity of the surface. Average 100 sq. ft. per gallon, two coats.	NONPORITE MASONRY STAIN "shall be applied in two coats to a clean, firm, dry surface after filling all cracks. New cement surfaces shall be first neutralised with a solution of 1 lb. zinc sulphate and ¾ lb. sulphuric acid to a gallon of water."

(Continued on next page)

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A A File No.

NONPORITE PTY. LTD.

Manufacturers and Contractors

Tel. Haw. 1060

N.S.W.—McKINLAY, FLETCHER LTD., 189 CLARENCE STREET, SYDNEY
S.A.—ATKINS LIMITED, 55 PIRIE STREET, ADELAIDE
QUEENSLAND—MESSRS. WILLERS & HALLT, PERRY HOUSE, ELIZABETH STREET, BRISBANE

WATERPROOFING AND

PURPOSE	WHERE APPLIED	NAME OF PRODUCT	DESCRIPTION AND USES
		Nonporite No. 3	(As above)
HARDENING (Floors)	Integral	Nonporite "Metalcote" Floor Hardener	Consists essentially of specially graded and graded metallic aggregate from slag and inert fillers, to be used with sand and cement for the production of integrally hardened cement floors
		Nonporite "Colourseal"	(As above)
	Surface	Nonporite Applied Hardener	These are crystals which, combining with the cement, form [illegible] silicate compounds which bind loose particles and effectively stop crumbling, dusting, etc. (Used on surfaces already laid down)
		Nonporite Slip Proof Grains	Nonporite Slip Proof Grains are used in cement floors for the production of a hard-wearing, non-slip one, and at the same time smooth surface. They consist essentially of pure crystalline Silicon Carbide.
OIL, ACID AND ALKALI RESISTANT (Concrete and Plaster)	Integral	Nonporite No. 2	(See above)
		Nonporite No. 3	(See above)
	Surface	Nonporite "Metalcote" Waterproofer	A metallic surface waterproofing for walls, tanks, vats, [illegible] It consists essentially of a chemical compound fine metallic base which in contact with air and moisture, rapidly oxidises. The oxidisation causes the metallic base to expand fourfold
		Nonporite No. 1B	A specially prepared phenol resin condensation product
STONE PRESERVATIVE	Surface	Nonporite "Sil-Col"	Sil Co. is an organic Silicon Compound consisting essentially of Silicon Ester. It is used as a preservative for decaying stone, brick and masonry by surface applications.
ROOFS — Cement	Integral	Nonporite No. 3	(See above)
ROOFS — Felt	Surface	Nonporite Bituminous Mastic Cement	(See above)
ROOFS — G.I.	Surface	Nonporite Bituminous Mastic Paint	(See above)

REFRACTORY

The Refractories Division of **Nonporite Pty. Ltd.** specialises in the production of high-grade super refractories for furnace and boiler linings, Kiln work, flue construction, etc., together with

FURNACE PRODUCTS

FOR FLUE CONSTRUCTION

Specify—all firebricks shall be laid in **Refractite** fire cement [illegible]

DOMESTIC FIREPLACES.

Specify—all bricks in hob, hearth, back and throat of fireplaces shall be laid in **Refractite** mortar

FURNACES.

All types, consult **Nonporite Pty Ltd.** Specify for lining as recommended by manufacturers.

PRODUCTS AVAILABLE.	Base	Name
Fire Cements—	Aluminium Silicate Chrome Silica Silicon Carbide Aluminous	Refractite Chromefractite Silica Carbolox Fused Alumina
Bricks, Shapes and Slabs—	Aluminium Silicate Sillimanite Silicon Carbide Aluminous	Plastofrax Mullox Carbolox Fused Alumina
Plastic Refractory—	Aluminium Silicate Silicon Carbide Aluminous	Plastofrax Carbolox Plastic Special

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NONPORITE PTY. LTD.

294-296 Burwood Road, Hawthorn
E.2, Victoria

W.A.—HARRIS, SCARFE & SANDOVERS LTD., HAY STREET, PERTH
TAS.: LAUNCESTON SALISBURY'S FOUNDRY CO. PTY. LTD., 33 CHARLES STREET
" HOBART R. L. DITCHAM, ESQ. 54 COLLINS STREET

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S.A.A. File No.

PRESERVATIVE PRODUCTS

APPLICATION	CAPACITY COVERING	HOW TO SPECIFY [All Specification Clauses set out below shall be completed as follows "Strictly in accordance with the manufacturer's directions."]
[illegible]	[illegible]	[illegible]
[illegible] in both top-[illegible] and monolithic floors for railroad platforms factories, [illegible] piers and for [illegible]	[illegible] 20 lbs. of "Metalcote" per 100 sq. ft. of surface according to nature of traffic	WEARING COURSES INTEGRAL WITH SLAB. To the screeded surface before the surplus water has gone, first sprinkle a mix composed of 100 lbs. 'Metalcote,' 2 bags of cement and 3 bags of sand for every 1,000 square feet of surface. Trowel then apply mix of 200 lbs. 'Metalcote' and 2 bags of cement for same area." WEARING COURSES LAID AFTER SLAB HAS SET. To surface as above sprinkle equal volumes of 'Metalcote' and cement."
[illegible]	[illegible]	[illegible]
[illegible] 2 lbs. crystals to 1 gal. [illegible] 2 coats, allowing six hours between coats.	[illegible] sq. ft. in 2 coats.	NONPORITE APPLIED HARDENER crystals shall be dissolved in the proportion of 2 lbs. to each gallon of water and applied in 2 coats at an interval of 6 hours to a cleaned down dry surface.
Sprinkle the grains evenly over the freshly prepared work. Tamp, float and trowel in the [illegible]	Use ¾-1 lb. per sq. ft. of surface	(See Method of Application)
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible] in successive coatings, to the thoroughly clean, damp wall	Use 30-40 lbs. of Metalcote Waterproofer per 100 sq. ft. of surface.	(Enquire from Manufacturers)
(As for Nonporite No. 1).	100 sq. ft. per gal., two coat work	(Enquire from Manufacturers)
Apply Sil-Col by brush or spray to the clean, dry surface. Allow at least 24 hours between successive coats.	For average work 100 sq. ft. per gallon, two coat work	(Enquire from Manufacturers)
(See above)	(See above)	(See above)
(See above).	33 to 100 sq. ft. per gallon	(See above)
(See above)	800 sq. ft. per gallon.	(See above)

DIVISION

a range of refractory cements suitable for all types of work from the setting of domestic fireplaces, cooking stoves, etc., to industrial conditions of the highest temperatures attainable

INSULATION

Various types of products are produced to meet the requirements of industrial insulation work, representative examples being:—

BOILER LAGGING.

Specify Nonporite INSULOX Plastic to be trowelled on and completed with a sealing and weatherproof coat of Bituminous Mastic.

PIPE LAGGING.

Specify Nonporite INSULOX Plastic pre-made sections to be bound and coated with Bituminous Mastic Seal

FURNACE INSULATION.

INSULOX standard, 9in. x 4½in. x 3in. bricks and shapes to any design will give effective insulation and conserve heat losses at all temperatures ranging up to 1,800 deg. Fahr.

COOL CHAMBERS.

Waterproofed INSULOX bricks for permanent work

SOUND INSULATION.

INSULOX bricks in various thicknesses are particularly efficient

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S.A.A. File No.

COLEMANOID

A PRODUCT OF THE ADAMITE CO. LTD., LONDON

COLEMANOID DISTRIBUTORS:

NEW SOUTH WALES:
Frank Hambridge,
22 Bridge Street, Sydney, N.S.W.

VICTORIA AND TASMANIA:
H. Perks & Co. Pty. Ltd.,
31 Queen Street, Melbourne, Vic.

QUEENSLAND:
Underhill, Day & Co. Ltd.,
Queen Street, Brisbane, Qld.

STH. AUSTRALIA & WEST AUSTRALIA:
Francis H. Snow Pty. Ltd.,
King William Street, Adelaide, S.A.

N.Z. G. L. Tacon & Co., Panama Street, Wellington

CONCRETE WATER-PROOFER AND HARDENER

"Colemanoid"

"Colemanoid" is a liquid chemical compound a waterproofer and hardener for Portland cement concrete. When added, in a certain percentage to the gauging water of Portland cement mixtures, it produces, without retarding setting, a dense and hard concrete not only impervious to moisture and water, but to the penetration of heavy oils, gas and acid solutions. Its use ensures the filling of voids and the formation of a hard and insoluble silicate of great tensile strength. Successful solutions of difficult and intricate concrete problems during the past 25 years demonstrate the waterproofing qualities of "Colemanoid."

As a Water-Proofer

Waterproofing may be effected either in the concrete mass or by a cement rendering if "Colemanoid" is added to the gauging water in the proportions stated in the specifications. Either method will properly waterproof a concrete wall against a head of water. "Colemanoid" is ready for use and adds to the job no expense of mixing or stirring, and is of exceptional value where work is being carried out by unskilled labour. But once in the gauging water it must be in every part of properly mixed concrete. The use of "Colemanoid" in mass concrete retaining walls considerably speeds the work and saves the expense of the old-fashioned types of asphalt renderings.

When mixed with Portland cement and sand, and applied as a coating to the interior or exterior of walls, "Colemanoid" produces a complete waterproofing material. Similarly mixed, it provides excellent damp-proofing and waterproofing for brick mortar, as well as a preventative against efflorescence. Mixed with water and cement, it forms a damp-proof paint which can be used for grouting or application to inside masonry walls.

As a Floor Hardener

"Colemanoid" mixed in the gauging water of concrete floor toppings, whether the toppings be of cement and crushed bluestone, or of coarse sand and cement, has no equal for producing a Portland cement concrete floor surface that is dustless and presents the maximum of resistance to wear and tear. It increases the hardness of the concrete of which it is an integral component. At the age of three days the hardness of a "Colemanoid" topping finish is equal to that normally attained in one month's time. "Colemanoid" increases both the tensile and compressive strength of concrete by 22 per cent. to 25 per cent. It does not affect the colour of the floor. Any desired colour for floors may be obtained by adding a small proportion of mineral oxide to the dry mix.

The application of "Colemanoid" to the floor topping is economical—one gallon being required for approximately 100 sq. ft. to 120 sq. ft. of 1 in. floor finish which will withstand heavy traffic and be impervious to oils, greases and acids. "Colemanoid" is therefore recommended for use in sugar refineries, breweries, tanneries, dairies, paper mills, etc., and wherever unusual acid, oil or general service conditions prevail.

Supplies and Service

"Colemanoid" is available in 4-gallon drums. No charge is made for the containers, which are not returnable. If desired, delivery can be made at exact cost of transportation. Large stocks are kept at the warehouses of interstate representatives, and immediate delivery can be guaranteed.

Detailed specifications or advice on any waterproofing subject are available, without cost, to the architect, engineer, and contractor.

SOME OF THE MORE IMPORTANT JOBS IN WHICH "COLEMANOID" HAS BEEN USED:

NEW SOUTH WALES—

Peters American Delicacy Factory, Newcastle.
Architect
Builders: MacConnell Building Co. and McLeod & Sons, Plasterers.

Bondi Beautification Scheme, Bondi
Architect: Robertson & Marks.
Builders, MacConnell Building Co.

J. Kitchen & Sons, Soap Works, Alexandria.
Architect: Mr. Benn.
Builder: Mr. A. C. F. Turn.

Sun Newspapers Ltd. Sydney
Architect: Mr. J. Kerrell.
Builders: Concrete Constructions Ltd.

Brook House, Sydney.
Architects: Spencer & Spencer.
Builders, H. W. Thompson & Co.

VICTORIA

Austin Hospital for Chronic Diseases, Heidelberg.
Architects: Stephenson & Meldrum.
Builders: T. R. & L. Cockram.

Queen Victoria Hospital, Melbourne.
Architects: Stephenson & Meldrum.
Builders: W. C. Burne & Sons.

Carba Dry Ice Factory, Abbotsford
Architect
Builders: Clements Langford Pty. Ltd.

"Truth" Building, Melbourne.
Architects: Godfrey & Spowers.
Builders: Hansen & Yuncken.

Carreras Tobacco Factory, Prahran
Architect, J. Plottel.
Builders: Permasite Flooring & Partition Co.

QUEENSLAND—

Little Flower Church, Kedron, Brisbane.
Architects: Hennessy & Hennessy
Builders: S. S. Carrick

Tramway Department, Brisbane.
Architect, Mr. Ogg
Builders: Tramway Department

Dalgety's Hide Stores, Brisbane
Architect: F. Hall.
Builder: A. Mitson

Mount Isa Mines Ltd., Mount Isa
Architect: M. J. Callow
Builders: Mount Isa Construction Branch.

WORK EXECUTED—

SOUTH AUSTRALIA—

Waterproofing inside walls and fountain-pool of S.A. War Memorial.
Architects: Woods, Bagot, Jory & Laybourne-Smith.
Contractor: S.A. Monumental Works Limited.

Waterproofing retaining wall and elevator pits, Elder, Smith & Co. Ltd., Wool Store, Port Adelaide.
Architects: Woods, Bagot, Jory & Laybourne-Smith.
Contractors: Fricker Bros.

Waterproofing retaining wall "Advertiser" Building.
Architects: Woods, Bagot, Jory & Laybourne-Smith.
Contractors, Fricker Bros.

Glenelg Corporation—Waterproofing basements of kiosks on sea wall level below high water level.
Architect: Glenelg Corporation Engineer.
Contractor: Glenelg Corporation.

(Continued on next page)

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ARCHITECT'S SPECIFICATION

WATERPROOFING MASS CONCRETE

To the 4:2:1 mix, for gauging, add 1½ gallons of "Colemanoid" for every cubic yard of concrete. Proper consistency will be obtained if one gallon of "Colemanoid" is added to each 10 to 15 gallons of gauging water. Waterproofing shall be carried up to a point one foot above grade line. If forms are below water level, concrete shall be poured stiff.

Wherever possible, floor slabs, exterior walls and floorings shall be poured in the one operation. If construction joints are necessary, they shall be made as later specified.

Note.—To resist acid attacks, specify a proportion of one gallon of "Colemanoid" to six of water.

WATERPROOFING IN COATINGS

Note.—First specify the interior or exterior surfaces of exterior walls and upper surfaces of concrete slabs below grade that are to be treated.

These surfaces shall be waterproofed by the application of a plaster coat of one part Portland cement, and two parts of clean sharp sand, gauged and tempered with a solution of one part of "Colemanoid" to each 10 parts of water.

Wall coatings shall be ¼in. thick, properly bonded and coved to floor, and carried up to one foot above the grade. Floor work shall be one inch thick, and serve the double purpose of waterproofing and making a hard, dustless floor surface. (See Specification for "Floor Hardener.")

BRICKWORK MORTAR

The mortar shall consist of one part Portland cement and two parts of well washed sharp sand, tempered with a liquid composed of one gallon of "Colemanoid" to each 10 gallons of water.

FLOOR HARDENER

Lay upon concrete floor slabs a one inch topping course of one part Portland cement (a) two parts of clean, hard, sharp sand of coarse grain and silicate character, or (b) two parts of finely-graded bluestone screenings. The dry mix shall be gauged and tempered by adding "Colemanoid" to all water used, in the proportions of one gallon of "Colemanoid" to each 10 gallons of water.

Note.—Strike out (a) or (b) as desired. For resistance to grease and acid attacks, specify one gallon of "Colemanoid" to six of water.

CONSTRUCTION JOINTS

To insure a bond to underlying masonry, all surfaces, before application of waterproofing on new concrete, shall be thoroughly roughened, cleaned, dampened, and a grout (composed of one part "Colemanoid," three parts water, and sufficient Portland cement to give the mixture the consistency of a heavy paint) brushed on the roughened surfaces. New work shall be applied within an hour after the base surfaces have been grouted.

The Adamite Company's complete specification will be sent on application to the Distributor—see list top first page.

TERRAZZO PAVING

GENOA TERRAZZO CO. PTY. LTD.

Floor Finishers and Pavers

152 CANNING STREET, CARLTON
VICTORIA

11a

S.A. File No.

Floor Finishing

The Genoa Terrazzo Co. Pty. Ltd. are specialists in the installation of concrete floor finishes and paving, their experience extending over many years and including numerous successful operations in Victoria. The types of floor finishes and paving which the Genoa Terrazzo Co. Pty. Ltd. are equipped to lay include the following:

- Granite Concrete Floor Finish
- Terrazzo Floor Finish
- Ironite Floor Finish
- Coloured Finishes
- Granolitan Paving
- Pre-cast Terrazzo Flags, Treads, risers, wall panels, sink tops, etc.
- Driveway and footpath one course pavements.
- Concrete floors

Entrance Hall to Shell Co.'s Building, Melbourne.
Floor laid in Terrazzo, including central design, stair treads and risers, by Genoa Terrazzo Co. Pty. Ltd.

Advisory and Contracting Services

In addition to laying concrete floors and floor finishes the Genoa Terrazzo Co. Pty. Ltd. will submit designs and estimates. Their long experience in this field enables them to be of great assistance to architects and others who contemplate laying concrete paving of any description.

Although the Genoa Terrazzo Co. Pty. Ltd. will lay finishes on concrete sub-bases which have been put down by others, they advise that the sub-base should be included in their contract because a successful floor depends to a great extent upon the correct relationship between the construction joints in the sub-base and finish. Under these conditions the company will guarantee their work to remain free from unsightly cracks or other defects.

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S.A.A. File No.

PERMASITE FLOORING & PARTITION CO.
PTY. LTD.

259 STURT STREET, SOUTH MELBOURNE

Telephone M 2658

PERMASITE

For other Products see Index]

THE CONCRETE FLOOR PROBLEM

The surfacing of concrete floors in modern commercial buildings is of very great importance to the life of the floor Without a good surface, a concrete slab would not stand up to the severe stresses imposed upon it, so that the life of the finishing coat determines the life of the whole slab

With this object in view, the Permasite Company have made a special study of paving, and behind every square yard of paving laid by the company is their experience of over 25 years of work in all types of floors under severe conditions

Not only is it necessary to use clean materials and expert tradesmen, but the grading and quality of the materials is of great importance In order to ensure this, all material is delivered into our works for grading before being used on the work, thus ensuring that the paving will stand up to the wear imposed on it

By the selection of the best materials and employment of high class workmanship, the Permasite Company are in a position to lay floors and pavings subject to any kind of known traffic conditions and of any area Estimates gladly furnished for work throughout the State

PERMASITE FLOORS

Granolithic

An ideal type of finish for concrete floors where light traffic is experienced Composed of Portland Cement and Bluestone toppings laid over the concrete slab, 1 inch thick, either before or after the base has set, and trowelled to a hard finish using steel trowels and cement driers

Ironite

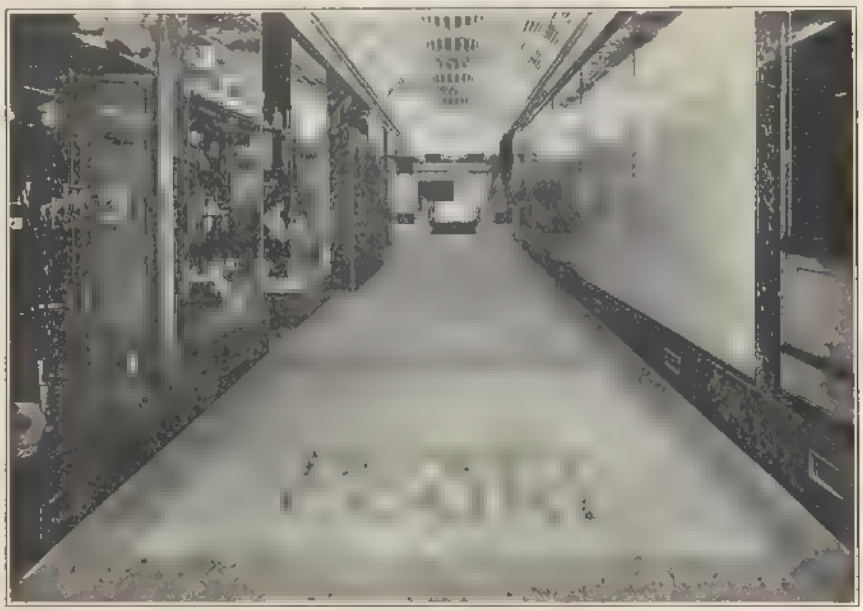
A finish composed of Portland Cement and crushed furnace slag (Ironite) for heavy traffic

Permacrete

A floor finish composed of Portland Cement, specially prepared finely-ground steel particles, and very tough crushed granite, and is the ideal floor finish in factories and industrial buildings subject to heavy wear from steel wheeled trolleys, etc., as in loading platforms, Butter Factories, Soap Factories, Machine Shops, Trucking Areas, Warehouses, Station Platforms, Printing Shops, Commercial Garages, Staircases, and anywhere a long life and slip-proof floor is required. In addition, it is water and oil-proof, and therefore ideal for tanks

By the introduction of certain materials, Permacrete can be made acid-proof against the majority of chemicals used in factories

The Permasite Co. are at all times pleased to discuss means of laying floors to resist any type of wear or chemical action



Example of Terrazzo Paving carried out by Permasite Co

Terrazzo

Terrazzo has been used extensively for flooring in this country for some years past. It consists of utilising small pieces of vari-coloured marble mixed with mortar It is laid plastic and allowed to set, is mechanically ground and polished smooth. This furnishes sanitary, durable, fireproof and remarkably long wearing floors in attractive colours. The great variety of colours and shades obtained by mixing various kinds of marbles in correct proportion enables the carrying out of any decorative scheme desired Permasite Terrazzo may be seen in many colours and patterns. We also manufacture and erect precast terrazzo stair treads and risers, skirtings, wall panelling, etc

Permasite Composition

This kind of flooring is a composition of a magnesium base and aggregate of other finely-graded minerals selected to produce a flooring which is clean, of pleasing appearance, of any colour, quiet, resilient, non-slipping, damp-proof, durable, fireproof—it combines all the good features of concrete, tile wood and linoleum

It is installed in a plastic state and sets in a few hours It can be successfully laid over old wood floors as well as in new buildings over concrete—laid monolithic with or without coves or sanitary bases Permasite composition does not contract when setting, and can therefore be laid in large areas without joints, ensuring a hygienic floor It can be added to or altered without visible joints

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

DUNLOP PERDRIAU RUBBER CO. LTD.

Manufacturers of Rubber Flooring, and every description of Rubber Goods.

DUNLOP PERDRIAU

MELBOURNE: 108 Flinders Street. Phone: Central 10740 (14 lines)
SYDNEY: 27 Wentworth Avenue. Phone: M 2901 (15 lines)
BRISBANE. Centenary Place. Phone: B 1641 (10 lines)
ADELAIDE: 103 Flinders Street. Phone: Central 8050
PERTH: 424 Murray Street. Phone: B 8181
HOBART: 35 Argyle Street. Phone: 3989
LAUNCESTON 93 York Street. Phone 1850

28i

S.A.A File No

Products

Dunlop Perdriau Rubber Flooring manufactured in tile or sheet formation and in standard designs and colour combinations

Tiling and Flooring

Rubber is the most modern material for covering floors and possesses a combination of qualities which is found in no other type of floor covering It not only has properties in which competitive materials are deficient, but has many of those for which they are noted. Its advantages are sufficiently evident to have already attracted the majority of architects, and its daily increasing use is rapidly proving its paramount importance to the building trade

Dunlop Perdriau, in addition to offering the very highest grade rubber tiling and flooring, are in a position to give a complete and efficient service in connection with its use. Anyone requiring information on any phase of rubber floors is invited to apply to Dunlop Perdriau Rubber Co Ltd, and those who order these materials can rely on the experience of our experts in every detail, from the preliminary design suggestion to the finished work.

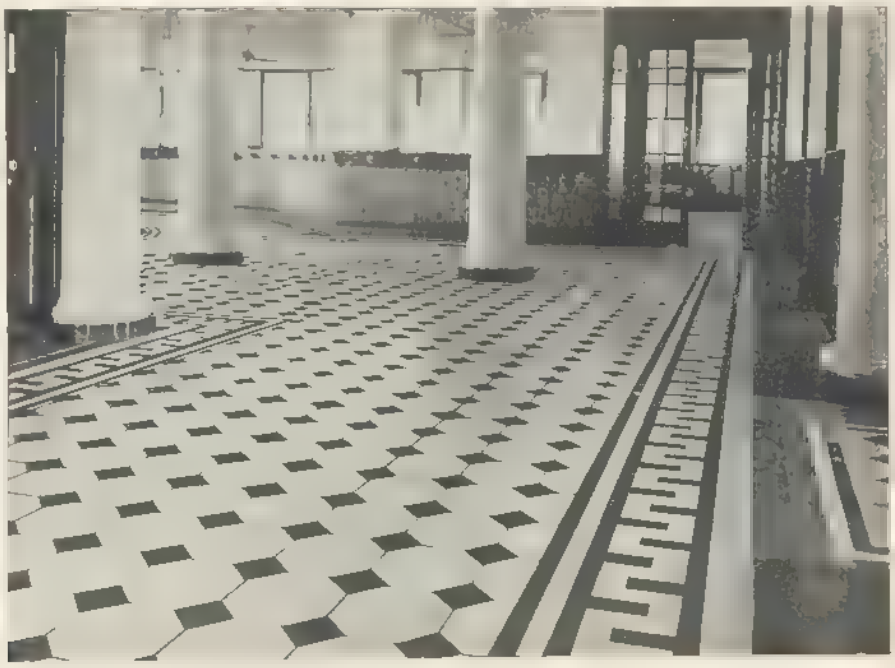
Rubber Floors Their Value to the Modern Building

By long experience and intensive research, Dunlop Perdriau Rubber Co. Ltd are able to supply flooring materials unrivalled for quality and durability, and the floors which now bear their name stand supreme in all main qualities

The characteristics which make Dunlop Perdriau floors of such value to modern building can be classed under ten headings

1. Almost everlasting
2. Easily cleaned
3. Silent and have non-slip tread.
4. Waterproof.
5. Fire resisting.
6. Hygienic and sanitary.
7. Materially improve acoustic properties
8. Shock absorbing
9. Adaptable to colour and design.
10. Non-conductor of electricity

Dunlop Perdriau floors represent the truest economy, for although their original cost is slightly higher than some types of floors, the almost everlasting life they enjoy far outweighs the difference in first cost



Section of Flooring, Broken Hill Proprietary Co. Ltd. (N S W)

No 3 Design in Dunlop Perdriau Matting Brochure

Rubber Floors Their Uses

The unique combination of qualities of Dunlop Perdriau rubber floors renders them suitable for almost every class of building They are especially appreciated in situations where hygiene is the first essential, where heavy wear is experienced, where silence is desirable, or where easily cleaned waterproof flooring is necessary

Sanitary and Odorless

Its non-absorbent, smooth texture surface affords no lodgment to disease germs or odors. The slight characteristic rubber odor soon disappears

In addition to ensuring such exceptional durability, Dunlop Perdriau floors offer the comfort and silence of carpeted floors, not only at a lower price, but also with the important advantage of requiring only soap and water to keep them hygienically clean.

The increasing attention which is being paid to the psychological effects of colour in decoration is provided for by the wide range of colours and styles in which Dunlop Perdriau floors can be obtained, and by the design service which Dunlop Perdriau offer. A qualified staff, with experience in all types of decorative work, is engaged to submit designs and colour schemes suitable for any class of building.

(Continued on next page)

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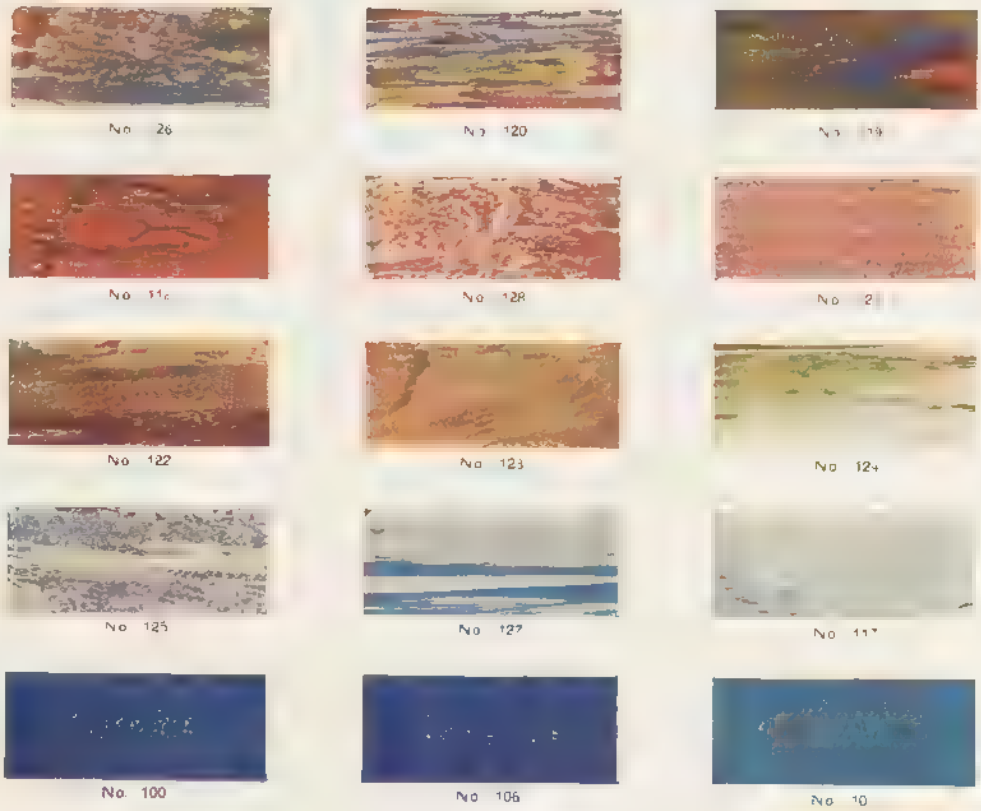


COLOUR CHART—DUNLOP PERDRIAU RUBBER MATTING

Whilst the colours depicted in this Colour Chart and the one on the following page are reasonably close to the finished colour effects obtained in Dunlop Perdriau Rubber Matting, the Company does not hold itself responsible for any slight divergences in colour of Matting as compared with colours illustrated

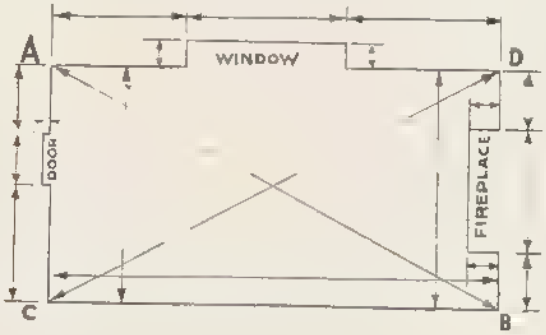
Thickness and Inlays

Dunlop Perdriau matting is obtainable in plain or variegated in the following thicknesses ⅛ in., $\frac{3}{16}$ in. and ¼ in Inlaid matting in thicknesses of $\frac{3}{16}$ in. and ¼ in The design of inlaid matting is not a surface one, but is inset right through, thus ensuring permanency of pattern

We advise the use of either $\frac{3}{16}$ in., or ¾ in. thick material for floor coverings, ½ in. for counter tops, etc.

Necessary Measurements

When enquiring for or ordering Dunlop Perdriau rubber flooring, please give the following details



(1) Give fullest details of dimensions, as shown on the above sketch and, if possible, send scale plan of the area to be covered

(2) If the skirting board is not straight, make a special note of the fact

(3) Full details of the measurements of diagonals are essential if the room is not square. (See A-B and C-D above.)

(4) Where curves exist send a template or state radius of the curve

(5) State thickness of rubber required.

(6) Give details of general colour scheme of walls, ceilings, etc State the purpose for which the room is used office, showroom, residential, etc, and, if you think it necessary, state style of furniture in use.

(7) After perusing designs, borders, etc., in Dunlop Perdriau Illustrated Matting Brochure, give details of the type of design and borders you prefer

(8) If a square tiling design is preferred, calculate size of squares recommended to see that they fit in exactly with centre area and border

(9) State type of floor on which it is proposed to lay the rubber, and say whether there are any irregularities which are likely to penetrate the rubber or cause unevenness after laying

Laying of Dunlop Perdriau Rubber Floors

The satisfactory service of a rubber floor depends very largely on correct laying, and in view of this we recommend that all Dunlop Perdriau floors shall be laid by our own experts Out of pocket expenses only are charged for laying. This procedure, in addition to ensuring the best work, enables Dunlop Perdriau to operate their complete service

In new buildings, where it is intended to lay rubber matting, it is suggested that Dunlop Perdriau be consulted regarding composition of sub-floor, as frequently expensive sub-floors are unnecessarily installed. Where the use of rubber flooring is decided upon, it is often possible to effect considerable saving by the preparation of a cheaper sub-floor

(Continued on next page)

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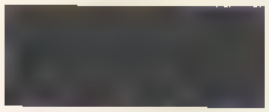
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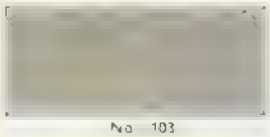
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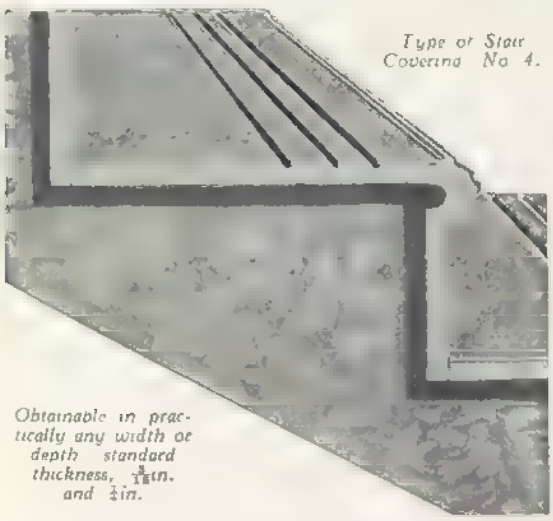
No 105

No 110

No 101

Stair Treads

Dunlop Perdriau specialises in a variety of rubber stair treads suitable for practically any type of stairway which afford exceptional advantages. They provided perfect security to the tread and lessen the noise of the building. Their wearing qualities are unequalled, and are especially suited to withstand the uneven wear experienced on stairs. In the event of one stair becoming worn in part replacement can be made without affecting the whole length of the stairway



Type of Stair Covering No 4.

Obtainable in practically any width or depth standard thickness, $\frac{3}{16}$in. and ¼in.

If rubber is fitted to a new staircase, the treads of which can be made of inexpensive wood or concrete, the bases of the stairs can never be worn

4 Different Types of Stair Coverings

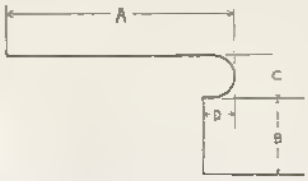
Dunlop Perdriau stair treads are available in all colours and of the 4 following types:

1. Stair tread and nosing in one piece (thickness $\frac{3}{16}$ in and ¼ in.)
2. Stair tread only (standard thickness $\frac{3}{16}$ in. and ¼ in.)
3. Inset tread fitted in prepared wells on stairway Thickness, ⅛ in. to ¾ in.
4. Stair tread moulded in one piece to cover tread and riser

This latter type is obtainable in two different sections viz., with bull nosing (as illustrated at left) or a perfect right angle for stairs, not finished with a projecting nose

Thickness—Bull nosing, $\frac{3}{16}$ in. thick only.
Right angle, $\frac{3}{16}$ in and ¼ in.

When enquiring for or ordering Dunlop Perdriau stair coverings, please give the following details:



(1) Number of steps.
(2) Length of treads.
(3) Depth of treads, as A on sketch. This size should be from face of riser to front of nose. Sketch showing full sizes of winders, if any, should be given.
(4) Thickness of nose, C on sketch. A cardboard template to give both C and D is better.
(5) Height of riser B.
(6) Size of landings, if any
(7) Thickness of rubber for treads We recommend material ¼ in thick but $\frac{3}{16}$ in thick is suitable for residences
(8) Design.
(9) State if rubber is to be full width of stairs.

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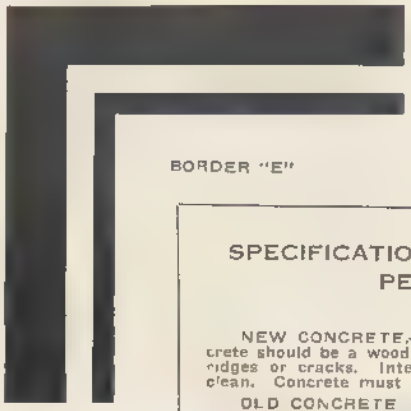
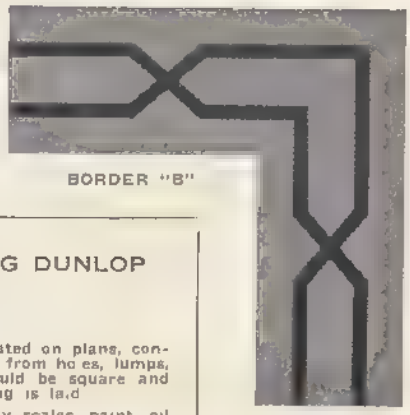


BORDER "E"

The borders shown on this page are adaptable for plain, variegated or inlaid matting and are available in any colours (see Colour Chart).



BORDER "B"

SPECIFICATION NOTES FOR INSTALLING DUNLOP PERDRIAU RUBBER FLOORS

PREPARATION OF SUB-FLOOR

NEW CONCRETE.—In floor space where rubber is designated on plans, concrete should be a wood-floated surface and perfectly level, free from holes, lumps, ridges or cracks. Intersections between walls and floors should be square and clean. Concrete must be thoroughly dry before rubber matting is laid.

OLD CONCRETE. Clean surface thoroughly, removing any scales, paint, oil or grease. Fill holes and depressions flush with level of floor.

(Continued below.)

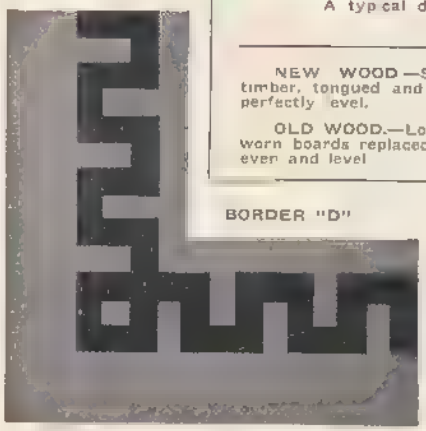
Illustrated Art Brochure replete with colour designs, borders etc. will be mailed on request to Architects.

A typical design of Inlaid Rubber Matting (Design No. 7)—A marbled effect with Border "F"

Illustrated Art Brochure replete with colour designs, borders etc. will be mailed on request to Architects.

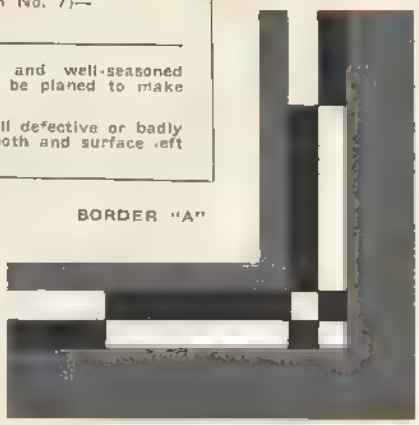
NEW WOOD.—Sub-floors should be thoroughly dried and well-seasoned timber, tongued and grooved. Surface, if necessary, should be planed to make perfectly level.

OLD WOOD.—Loose boards should be nailed tight and all defective or badly worn boards replaced. All unevenness should be planed smooth and surface left even and level.



BORDER "D"

Other borders than those shown on this page are available—also the different borders depicted can be adapted for surrounding any type of design. (See Matting Brochure.)



BORDER "A"

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

24a

S.A.A. File No.

"DERMAG"

(MAGNESITE ASPHALTIC FLOORING)

(INCORPORATING DERMAS BRAND EMULSION)

Supplied by:

NEW SOUTH WALES.—Bradshaw & Co. Ltd., "Sirius House," 23 Macquarie-place, Sydney.

VICTORIA.—James Bell Mineral Products Pty. Ltd., 31 Queen Street, Melb., C.1

WESTERN AUSTRALIA.

SOUTH AUSTRALIA.—James Bell & Co. Pty. Ltd., Blight St., Croydon, Adelaide.

QUEENSLAND.—Barker & Co. Ltd., 87-89 Eagle Street, Brisbane.

24a

S.A.A. File No.

Description

"Dermag" is an ideal flooring of international fame. It is a warm, jointless, resilient, durable and self-polishing floor; it is a composition of a magnesium base and an aggregate of other finely graded materials which, with an asphaltic solution known as "Dermas" Brand Emulsion, is laid in a plastic state to form, on setting, a smooth, monolithic surface. "Dermag" is manufactured to an international formula, available exclusively to the Australian manufacturers of this material; not only does the formula cover "Dermas" but also the use of the special mineral ingredients. This formula, which the success of "Dermag" as a flooring relies upon, is the outcome of scientific research, and was arrived at only after much experiment. "Dermas" Brand Emulsion, asphaltic in nature, yet decolorised, gives very special properties to floors of this type; in fact, the addition of "Dermas" Emulsion overcomes all the difficulties that are common to ordinary magnesite. "Dermas" Emulsion is added to the mixture while it is being gauged, thus the asphalt thoroughly permeates the whole mass. All the materials entering into the composition of "Dermag" are under scientific control and are continually analysed, thus assuring the achievement of reliable results.

Colours

"Dermag" is self-colouring and is made in a full clear, bright colour range, including red, brown, buff, grey, green, etc. The colours are non fading and are permanent throughout the life of the floor. Conventional designs of two colours or more, also marbled effects, are easily adapted to this type of floor; the colour of "Dermag" flooring will harmonise with any colour scheme.

Application

Base.—"Dermag" may be laid on either a concrete or on wooden base—it bonds perfectly with wood or concrete and is adaptable to both new construction and alteration work. "Dermag" can be laid directly over old wood floors without the expense of their removal, it is sufficiently elastic to withstand the spring of an ordinary wood floor.

How Applied.—Only skilled artisans are permitted to carry out the work of laying down "Dermag" flooring.

The material is applied with a trowel, either in one or two coats, depending on use (see schedule below), and may be carried up walls to form coves or 6-in. skirtings. The weight is approximately 1 lb. per sq. ft. to each ¼-in. thickness. The firms listed above are equipped to carry out this work in any part of their own State, and will be pleased to submit prices for large or small areas.

Advantages of "Dermag"

Durability.—"Dermas" Emulsion, because of its elastic nature, enables the material to be gauged much richer than ordinary Magnesite mixtures; this, of course, renders the floor much harder. The presence of the asphalt itself will further [illegible] the floor and make it much more durable. [illegible] and durable floors may be prepared for factories where there is heavy wear.)

Resilience.—"Dermag" has all the [illegible] properties of wood [illegible] it [illegible] stand on.

No Maintenance.—[illegible] floor [illegible] practically no maintenance at a later date. The floors are [illegible] easily cleaned and need very little polish. The very nature of the material provides a non slip surface.

Non-Warping or Frosting.—The presence of asphalt will eliminate any chance of warping and frosting.

[illegible] insulates against cold and moisture when laid on concrete base, and is therefore a most desirable covering for schools, factories and workrooms, where students and employees are constantly on the floor. Health authorities strongly endorse its use.

Hygienic.—"Dermag," being jointless, is thoroughly hygienic. It imparts no smell when new, such as linoleum or rubber does. Furthermore, it is quiet to the tread, and these advantages make it a desirable covering for hospital floors, etc.

Where "Dermag" Should Be Used

Banking and Insurance Chambers	Corridors
Offices	Hospitals
Factories, etc.	Cafés
Churches	Hotels
Showrooms	Schools
Shops	Kitchens
	Bathrooms

Work Carried Out

Australia—

The Shell Co. of Aust. Ltd., Adelaide; Architects, McMichael and Harris.

Royal Sydney Golf Club, Sydney; Architects, Wardell, Moore and Dowling.

Overseas.—"Dermas" Floors have been used in all leading countries in the world in various public buildings, factories, hospitals, residences, etc. It has even been used on decks of large liners.

Schedule of Thicknesses

General Office (on Concrete Base)—

(a) Plain work . . . . . Undercoat ⅜, Top Coat ⅜; Total ¾

(b) Mottle work . . . . . Undercoat ⅜, Top Coat ⅜; Total ⅞

Kitchens—Bathroom (on Concrete Base)—

(a) Plain work . . . . . 1 Coat . ⅜

(b) Mottle work . . . . . 1 Coat . . ⅜

Kitchens—Bathroom (on wooden floor)

(a) Undercoat ⅜, Top Coat ⅜; Total ¾

or—

(b) 1 Coat ⅜ thick

Factories, Shops, etc.—

(a) Where wear is excessive, 1 coat ½ or ⅝ thick is recommended.

(b) Where extra resilience is needed, Undercoat ⅜, Top Coat ⅜ or ½ should be used.

A special factory mixture may be used when extra hardness is required. The above are the minimum thicknesses recommended and may be increased if desired.

Specification Details

The contractor shall see that the floors are left in a clean condition and shall provide all necessary pitch in concrete; he shall also provide to within . . . (depending on thickness of "Dermag") of finished floor line a true and even surface free from holes and projections.

All wood floors shall be well laid and made as rigid as possible—the same shall be brought up for "Dermag" to within . . . . (depends on desired thickness) of the finished surface.

Specification Clause

Allow the sum of £ . . . to be paid to Messrs . . . . . for the laying down of "Dermag" flooring in the position shown on drawings; the work shall be carried out by artisans employed by this firm and in accordance with their standard process and procedure. The contractor shall provide the haulage of materials on the job.

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11*d*

S.A.A. File No.

THE SHELL COMPANY OF AUSTRALIA
LIMITED

HEAD OFFICE: MELBOURNE

Branch Offices, Adelaide, Sydney, Brisbane, Perth, Hobart, Wellington, N.Z.

[For Other Products, See Index]

MEXPHALTE

Description

The various grades of Mexphalte and Spramex (which is the softest grade) are bitumens produced from asphaltic base oils, and are used throughout the world in the different types of paving and road construction. Bitumen is now generally used for the various purposes where previously tar was employed, since it is realized that the slight increase in primary cost cannot be considered when the life (and hence maintenance costs) of the two substances are compared, as bitumen is practically unaffected by weather conditions, but tar definitely deteriorates in time.

Uses

Obtainable in fourteen different grades, Mexphalte is used in all cases where bitumen is employed, such as the binder and waterproofing medium in damp-proof courses, waterproof membranes, acid resisting compounds, and for tennis courts and footpaths, drive and road construction or top dressing, etc.

The architect, safe in his knowledge of the integrity and service of the Shell Organisation, can with confidence simply specify "Mexphalte" (where in the past he has just specified "bitumen" or "tar") and thereby obtain the correct grade of a material which he can be sure will give entire satisfaction when used in any of the foregoing cases.

Bituminous Paints

Mexphalte is the bitumen incorporated in the following products:

Shell Bituminous Paint.—For preserving exposed iron or timber structures, and for water-proofing concrete tanks, retaining walls, etc., also for the periodical renovation and protection of roofing felts.

Shell Bituminous Cementing Paint.—For the attachment of cork slabs to walls of refrigerated chambers, the laying of roofing felts, and for the many purposes which require an adhesive medium.

COLAS

Description and Uses

Colas is a chocolate-coloured liquid of a consistency slightly heavier than water, and is manufactured by a patented process which specially prepares bitumen in order that it may be used without heating. It is ready for immediate use and may be applied to wet surfaces as well as to dry. Colas needs only to be poured upon the surface, drawn out evenly by a broom or rubber squeegee, and covering with clean sand to give an excellent bitumen dressing on any suitable surface. It is thus particularly suitable for surfacing gravel drives, tennis courts and repairing existing paths, as well as for covering concrete or timber floors and decking or stone-paved areas.

Preliminary Preparation of Sub-bases

The following preparation may be necessary to bring the existing earth surfaces for proposed drives or paths into a suitable condition prior to surfacing with Colas.

The area should be weeded and all the roots removed. As the surface after treatment will be waterproof, provision must be made to dispose of rain water by gutters or drains. Humps should be trimmed down to the desired level, and any large depressions filled and well consolidated.

Pot holes or disintegrated patches in a surface already asphalted must be cut out so as to obtain vertical sides to the hole, which should be painted with Colas and then clean toppings or gravel mixed with Colas (so that the surfaces of the individual particles are only just covered) immediately packed into the hole, rammed down, and finally given a coating of sand. Alternatively the holes could be filled with clean toppings or screenings, which are consolidated by watering and ramming and a light coat of Colas poured into the voids of the surface which is then covered with sand and again rammed.

The Construction of New Paths or Tennis Courts

Drainage should be given consideration as indicated in the previous paragraph and a foundation of ashes is often desirable.

Excavate to 2 in. or 3 in., depending on local conditions. Spread ½ in. screenings and consolidate well by watering and rolling so that the finished surface is of the required grade and camber. Pour Colas uniformly over the area, from a pouring can fitted with a Colas Pouring Baffle, at the rate of one half to three-quarters of a gallon per square yard. Cover with clean toppings (one cubic yard covering approximately 80 square yards) and roll well. The following day excess toppings should be swept off, and a further coat of Colas broomed over the surface so that one gallon covers from 4 to 5 square yards. This must be immediately covered with clean coarse sand or ⅛ in. grit (one cubic yard to 180 square yards) and rolled again. The surface will improve after a few days under traffic but if a very fine-grained finish is required for a tennis court a further coat of Colas swept out with a rubber squeegee, so that one gallon covers 8 to 10 square yards, should be applied, and immediately covered with bluestone dust and rolled again.

Colas for Repairing Old Asphalt Paths, Etc.

If necessary, existing surfaces should be prepared as indicated in the Preliminary Preparation of Sub-bases.

Apply Colas direct from a can fitted with a Colas Pouring Baffle or from a container, and distribute Colas with an old broom or rubber squeegee at the rate of one gallon of Colas to 5 to 8 square yards. Do not sweep to and fro, as this may cause premature settling out of bitumen. Cover dressing immediately with clean coarse sand, then lightly broom it uniformly over the surface and roll in well.

Delivery Service

Colas is available in 4 gallon tins and 44 gallon returnable iron drums, and is delivered by road or placed on rail as required. For road work Colas is sprayed accurately to specification from power bulk waggons of 1,000 gallons capacity.

A COLAS TENNIS COURT

Owing to the ease of application, Colas is now generally substituted for hot bitumen in the construction or surfacing of tennis courts.

AN IMPERVIOUS, DURABLE GRAVEL DRIVE

A private drive constructed by the Colas process, which renders the surface hard and waterproof by cementing the gravel particles in place and results in the appearance of a gravel surface.

AN INTERIOR MEXPHALTE FLOOR

After consideration of the various conditions to be fulfilled, it will be found that a Mexphalte area is the most suitable and economical.

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LUXFER	BROOKS, ROBINSON PTY. LTD. ELIZABETH STREET, MELBOURNE WORKS: MAFFRA STREET, SOUTH MELBOURNE *Telephone M 3131 (5 lines)*	11 j S.A.A. File No.

[For Other Products, See Index]

PAVEMENT, FLOOR AND STALLBOARD LIGHTS

Luxfer Lights

The Luxfer Company were the first people to realise the value of making Pavement Lights of more importance to architects and building owners than mere blocks of glass set in cast-iron frames.

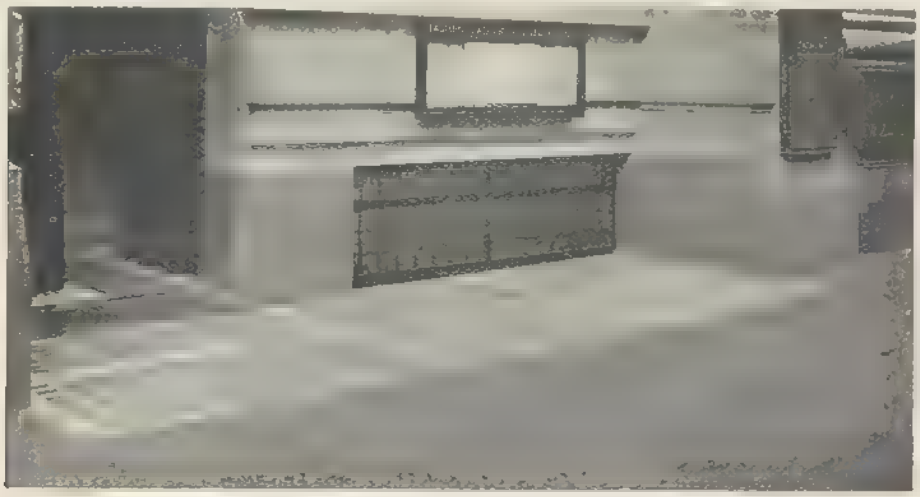
They saw that by scientific treatment, Pavement lights, Floor lights and Stall-board lights could be made to give a marked improvement in the daylighting of basements and other rooms not having a direct source of light from windows or skylights.

Luxfer Lenses

In the design of Lenses for pavement, floor and stall-board lighting, the following requirements should be observed

(a) They must admit the passage of the largest amount of light.
(b) They must direct the light as required.
(c) They must present the best wearing surface to all the hard wear and rough usage to which Pavement Lights are subjected

The design of "Luxfer" lenses is such that (a) and (b) are fulfilled to the fullest possible degree, and the material from which they are made (a special wear-resisting glass known as "R." glass) insures satisfactory service.



Pavement and Stallboard Lights—Eastern Telegraph Building, Melbourne.

Two Types of Construction

Pavement lights usually consist of glass blocks set in metal or concrete frames. The Luxfer Co., after many experiments, made their choice of Cast-iron frames as being the better, for the following reasons:

(a) The frames, in cast iron, could be made with astragals of sufficient size only to provide for suitable rebates to receive the lenses, and thus have least obstruction to daylight.
(b) A stronger and more reliable frame resulted owing to the elimination of the human element in misplaced reinforcing rods and badly mixed concrete.
(c) Astragals could be staggered to obtain the best lighting effect in the basement.

Ferro-concrete frames (not to be confused with pre-cast concrete frames) consist of reinforced concrete astragals hidden from underneath by the lenses. These lights have their limitations and should not be used where they are exposed to heavy traffic or hot sun. They are, however, invaluable when used in a concrete building as floor or roof lights where they are shaded from the direct sun rays. Maximum opening, 15 superficial feet, Maximum width, 3 feet

Installation

As the success of a pavement floor or stall-board lighting installation depends to a great extent on accurate installation, Brooks, Robinson Pty Ltd. recommend that architects should specify installation by their own staff of workmen, who are experienced and equipped to successfully handle such work.

Wherever possible pavement and roof lights should be given a fall of at least 1 in 12, but in some cases 1 in 20 is sufficient

ARCHITECT'S SPECIFICATION

PAVEMENT LIGHTS.

Pavement lights, where shown on plans, shall be "Luxfer" Pavement Lights in Cast-Iron (or Ferro-Concrete) frames, with (state whether iron, coloured or non slip cement, mosaic or terrazzo; tiled) surface between lenses.

Pavement lights shall be supplied and installed complete by Brooks, Robinson Pty. Ltd.

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11 j

S.A.A. File No.

B. G. PLUMMER & CO.

2 PARKER LANE, HAYMARKET
SYDNEY

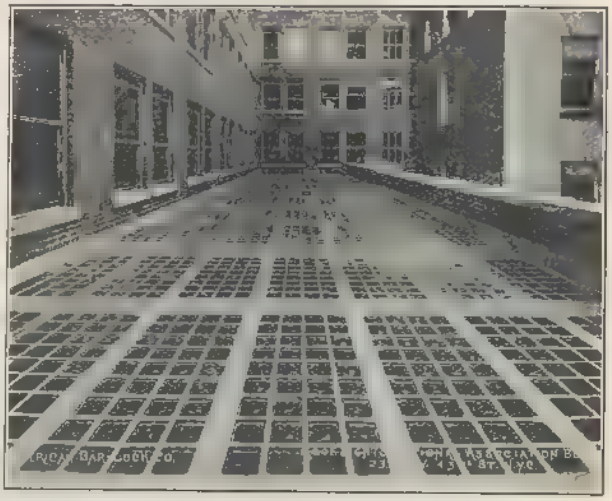
Manufacturers of "BAR-LOCK" Transparent Roofing (Skylights), Cast-Iron and Concrete-Framed Pavement Lights, Stall-Board Lights, also Salignum-Wood and Stone Preservative, White Ant and Borer Protectors, etc.

BAR LOCK

"BAR-LOCK" TRANSPARENT ROOFING

Materials and Construction

Bar Lock Transparent Roofing is strong and safe, being fireproof, burglarproof, weatherproof and entailing no maintenance cost. It is built of the strongest type ½ in. thick wired glass set in a reinforced concrete construction 1⅝ in. thick. It will carry safely a distributed load of 200 lbs. per square foot on a clear 8 foot span, and can therefore be used as a roof garden and for light foot traffic



Specifications

All skylights and areas designated to be of Transparent Roofing, as supplied by B. G. Plummer & Co., Sydney, shall be as follows 3½ in. thick concrete construction, reinforced longitudinally and transversely with steel reinforcing rods spaced 9⅝ in. centres. The glass shall be standard ½ in. thick wired 8¼ in. square, set in a cushion of tar and sulphur compound protected by 8¾ in. galvanized cast iron shields.

There shall be no exposed metal on the undersurface. Expansion joints shall be made around and extend to the bottom of the slabs, and filled to the top with a special caulking compound to prevent leakage.

Special Features

Bar-Lock Skylights are the only concrete framed skylights provided with a patent galvanized cast iron shield and mastic filling round each lense. These exclusive features eliminate breakage caused from expansion and contraction. On the other hand, should a breakage arise through accident or excessive abuse, the same exclusive features enable a new lense to be replaced quickly and easily without interfering with or damaging the concrete frame. These are big advantages and are worth special consideration.

Service to Architects

Special details of transparent roofing for any type of building construction will be furnished on request. We will be glad to give any information which may be required and quote prices.

Typical Installations

Parkes House, Hunter Street, Sydney.
Union Bank, Head Office, Pitt and Hunter Streets, Sydney
A.M.P. Society, Goulburn, N.S.W.
Messrs. Lawrence & Hanson's Premises, Brisbane
The Morris Hotel, Pitt Street, Sydney.
Watson's House, Bligh Street, Sydney.

PAVEMENT AND STALL-BOARD LIGHTS

Cast-Iron Frame Pavement and Stall-Board Light

These pavement and stallboard lights are especially constructed to provide maximum lighting and proof against extreme conditions of weather and use.

The method of construction consists of specially shaped glass prisms and lenses set with *mastic putty* in cast iron frames, which, by virtue of the great strength of cast iron, allows for very small sections, consequently increasing the glass area and reducing light obstruction to a minimum. The upper surfaces of frame are nibbed to provide non-slipping footholds and resistance to wear. The prisms and lenses, which are *specially annealed*, are spaced for good diffusion of light. The lenses transmit the light downwards, while the specially designed prisms project the light well back into the basement. Should breakages, due to accident or excessive abuse, occur, new glasses are easily and cheaply installed, without showing signs of repair. The *specially annealed* glass, which is very strong, combined with the *mastic putty*, which allows for expansion and contraction, reduces the possibility of breakage in these lights to the absolute minimum.

Service

Pavement and stallboard lights can be assembled on the job, or made in sections at our works and delivered to where required. Any further information will be supplied on request, and prices quoted. Pavement and stallboard lights are made up to suit any size area without additional cost. An extra charge is made for irregular shapes, such as rounds, ovals, checked frames, etc.

Typical Installations

Herald Office, Sydney.
Commercial Banking Co. of Sydney; Head Office, Sydney
Government Savings Bank, Brisbane.
Commonwealth Bank, Brisbane.
Kembla Building, Sydney.
T. & G. Building, Sydney.
St. James' Theatre, Sydney

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SECTION D

[Containing S.A.A. Filing Section No. 12]

ROOFING, SHEET METAL

— and —

SKYLIGHTS

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12b S.A.A. File No.	ORMONOID ROOFING & ASPHALTS COY. MENTMORE AVENUE, WATERLOO, SYDNEY, N.S.W. BRANCHES: HENTY HOUSE, 499 LITTLE COLLINS STREET, MELBOURNE RYAN HOUSE, MARKET STREET, BRISBANE. FACTORY REPRESENTATIVES McGLEW & CO. LTD., Waymouth Street, Adelaide. J. D. MOONEY, 36 Pier Street, Perth. J. E. CREESE, 94 Liverpool Street, Hobart.	ORMONOID ORAL

"ORMONOID" ROOFING, FLOORING, AND WATERPROOFING PRODUCTS

The waterproofing qualities and exceptional lasting properties of "Ormonoid" Bitumen Roofing, Flooring, Dampcourse and Associated Products made in Australia are now so well known that they are specified and used by leading Architects, Builders and Owners who desire reliable service over many years.

"Ormonoid" Bitumen Products are used on buildings and constructions of all types, including brick, concrete and timber. Special care is taken in the manufacture, so that "Ormonoid" Products cannot be surpassed in quality, consistency and suitability for their various purposes. They are absolutely impervious to moisture, unaffected by lime, cement, acids, in contact with them. They conform to the requirements of the Government Departments, Municipal Authorities and Public Health regulations. In addition to this, Government contracts have been held continuously over the past nine years, the official tests by such departments proving the high quality of "Ormonoid" Products at all times.

"Ormonoid" Roofing, Flooring and Dampcourse have stood the test of time in important and well-known buildings, Constructions and Public Works in every State of the Commonwealth, and repeat orders indicate satisfaction, confidence and goodwill throughout Australia to-day.

Information, advice and consultation is gladly given by the Manufacturers to all requests.

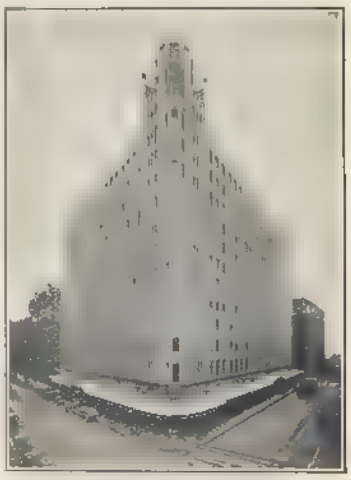
The Port Authority Building, Melbourne. Finished with "Ormonoid" Impervious and Watertight Roofing

Products

The following products are stocked by leading merchants and sold throughout Australia "Ormonoid" Roofing, Flooring, Dampcourse, Bituminous Cement Paint; "Oral" Saturated Felt, Sarking Felt, Ledcore Dampcourse, Natural Asphalt Dampcourse; "Tensite" Building Paper, "Asbeskote" Paint, "Givan ake" Expansion Jointing, "Duraseal" Plastic

Laying Department

Special Laying Departments are maintained in Sydney, Melbourne and Brisbane, quotations being given for roofing, flooring and dampcourse laid complete. This specialised Department, trained workmen and Superintendent Engineer ensure a laid job that will give many years' service. An additional protection is afforded by periodical inspections by the company of the completed work.



Grace Building, York and Clarence Sts., Sydney. Roofing Protection of "Ormonoid" Roofing and Gravel Finish

Recent Contracts

Sun Newspaper Building, Sydney
Physics Building, Sydney University.
International Hotel, Sydney
George Bond & Co. Factory, Sydney
Electricity Meter Manufacturing Co., Sydney.
Howey Court, Melbourne.
Bourke House, Melbourne.
Vacuum Oil Co., Melbourne

"Ormonoid" Waterproof Sheeting to Arch and Buttress of Sydney Harbour Bridge Approach
NOTE—The waterproofing on the arch is concealed by the protective concrete covering

Recent Contracts

Commercial Bank Building, Brisbane
Worker Building, Brisbane
Institute of Anatomy, Canberra
Transport Commission Offices, Sydney
Government Savings Bank, Sydney
Asbestos House, Sydney.
Exhibition Building, Melbourne.

(Continued on next page)

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ROOFING

Materials

The detailed examination of multiple layer built-up asphaltic roofing in various parts of the World over a period of many years has proved conclusively the long, useful service given by this type of roofing. In many instances roofs examined by our representatives have already seen fifty years' service and are still good for more years ahead.

"Ormonoid" Roofing

"Ormonoid" Roofing is made from the highest-grade rag felts thoroughly impregnated with specially refined asphalts under scientifically regulated control. "Ormonoid" is fume, acid and chemical proof and impervious to salt air. As an excellent non-conductor, it ensures an even temperature and is therefore the ideal roofing material for any climate.

Sizes of Rolls. Grey surface, in rolls of 72 ft. × 3 ft., covering 200 sq. feet of roof area, allowing for 2 in. laps.

Weights.—1-ply, lightweight, for temporary work, 64 lbs. per roll; 2-ply, medium, for ordinary conditions, 84 lbs. per roll, 3-ply, heavy, for permanent service, 104 lbs. per roll; 5-ply, extra heavy, for maximum results, 124 lbs. per roll.

These weights do not include clouts and cement for fixing, which are packed inside each roll.

Application

For maximum results the following alternate specifications are recommended:—

1. (See Sketch No. 1).
   - 1 Mopping Hot Asphalt, high grade.
   - 1 Layer "Ormonoid" 1 ply, best quality.
   - 1 Mopping Hot Asphalt, high grade.
   - 1 Layer "Ormonoid" 2 ply, best quality.
   - 1 Mopping Hot Asphalt, high grade.
   - 1 Layer "Ormonoid" 3 ply, best quality.
   - 1 Finishing Layer Screened Gravel, bedded in heavy mopping of hot asphalt, high grade.
2. (See Sketch No. 2)
   - 1 Priming Coat "Ormonoid" Bitumen Paint.
   - 1 Mopping Hot Asphalt, high grade.
   - 1 Layer "Ormonoid" 1 ply, best quality.
   - 1 Mopping Hot Asphalt, high grade.
   - 1 Layer "Ormonoid" 2 ply, best quality.
   - 1 Mopping Hot Asphalt, high grade.
   - 1 Layer "Ormonoid" 3 ply, best quality.

Preparation of Surface—Roof Slope: Timber approximately 1 in 50, concrete 1 in 100. Wood decking not less than ⅞ T and G closely clamped and well nailed.

ROOFING

Application (continued)

Concrete surfaces clean, dry and evenly graded to gutters and outlets. Angle fillets not less than 2 in. x 2 in.

On Concrete Roofs

Asphalt for Moppings—Heated to 340 to 360 degrees F. and used in coatings of not less than 30 lbs. per 100 sq. ft.

"Ormonoid" Roofing—Each layer is laid with breaking joints lapped 2 ins. at sides, 6 ins. at ends, and rolled into place and sealed with flood moppings of hot asphalt to roof deck and between each layer of roofing.

Gravel Finish. The final coating of hot asphalt, about 45 lbs. per 100 sq. ft. embedded, while hot, with 220 to 250 lbs. of clean screened (¼ to 5/16in.) gravel, per 100 sq. ft.

Flashings. Method of flashing indicated in Sketch 5 shows a combined application of dampcourse and flashing. Where the dampcourse is placed higher in the parapet wall, the usual method of angle fillets with the roofing extended over them and up the parapet, similarly to that shown, and counter-flashed with metal built into the brickwork or flashing groves, should be employed.

On Wood Roofs

The first layer of "Ormonoid" can be applied on to decking with hot asphalt, or staggered nailed with large headed clout nails spaced at 9 in. centres. The latter method should always be used where the roof will not have a ceiling underneath. The remaining roofing is laid as before.

Recommendations

The gravel top finish is strongly recommended as it deflects the harmful actinic rays of the sun and prevents disintegration. Thus, Specification No. 1 with its alternate layers of "Ormonoid" sealed with hot asphalt and finished with gravel provides the utmost in roof protection against harmful sun rays, and extreme weather conditions. When Specification No. 2 is used, a final coating of "Asbeskote" paint provides an excellent protective and preservative medium. A priming coat of "Ormonoid" Bitumen Paint to the concrete roof deck surface will always give improved results.

"Ormonoid" Roofing Cement

A Cold Liquid Asphalt Cement with high adhesive properties used for sealing and fixing "Ormonoid" and other asphalt roofings and floorings. In tins ready for use. Hot asphalt is recommended for sealing roofings on large roof areas.

"Asbeskote" Paint

A Tough, Elastic Paint of Asbestos Fibres and Bitumens, having exceptional weather resisting properties. For protection, repair and preservation of corrugated iron and all Bitumen Roofs. Applied with a brush. In two colours, red and black, in tins ready for use.

FLOORING

Materials

"Ormonoid" Flooring

Specially recommended for floors subjected to heavy traffic. Pleasing in appearance, damp-proof, vermin-proof, hard-wearing and economical, this sturdy fabric forms in itself a serviceable floor covering for wood or concrete floors, or in the lighter 1-, 2- and 3-plys it makes an ideal insulating or protecting underfelt for linoleum or carpets.

"Ormonoid" Flooring deadens noise and will not disintegrate like linoleum when subjected to dampness. It wears much longer, too.

Sizes.—Rolls, 72 ft. × 3 ft. (covers 24 sq. yds.).

Weights.—Grey, extra heavy, 5-ply, mica, smooth surface, 124 lbs. per roll. Red, extra heavy, smooth surface, 125 lbs. per roll; Red, medium, 96 lbs. per roll.

Application (see sketch No. 3)

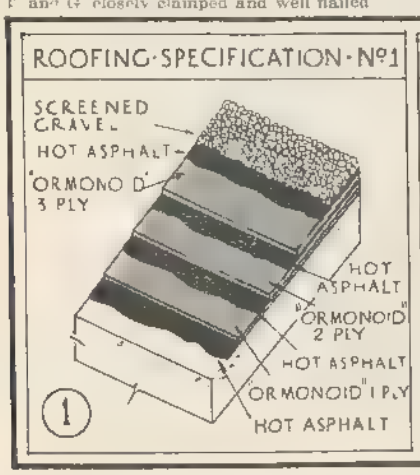
"Ormonoid" Flooring can be laid loosely or tacked like linoleum, but for best results it is recommended that a mopping of "Ormonoid" Roofing Cement be used for sealing it to floors. A space of ⅛in. needs to be left between the strips and at the skirting, this allows it to spread under traffic without wrinkling, until finally the edges fit so closely that the joints become unnoticeable. Wood floors must be reasonably smooth with nails punched flush or below the surface. Concrete floors should be swept perfectly clean. A good wax floor polish can be used a few weeks after the flooring has been laid. For exterior balconies which are to be waterproofed, the edges should be lapped 2 ins. and cemented.

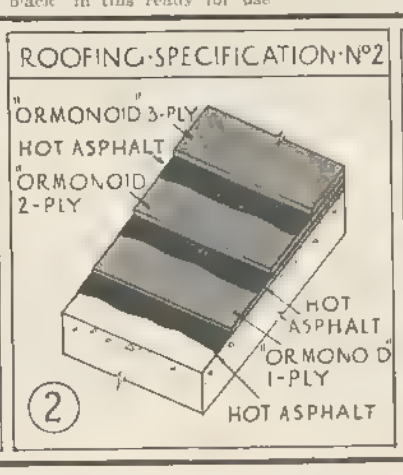
Recommendations

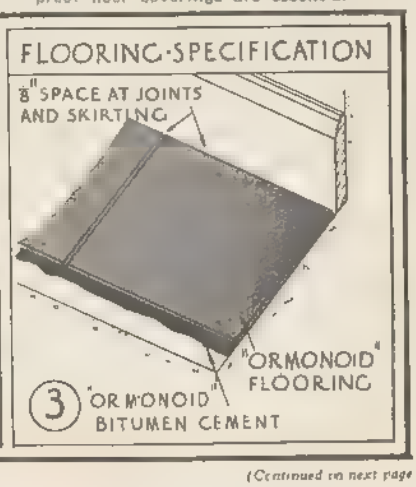
"ORMONOID" GREY, EXTRA HEAVY 5 PLY FLOORING is recommended for use in warehouses, industrial plants, etc., where severe and hard-wearing conditions are encountered.

"ORMONOID" RED, EXTRA HEAVY FLOORING is also used where long life is required, but on account of its pleasing texture and colour it is admirably suited for offices, stores, banks, private homes, etc.

"ORMONOID" RED MEDIUM FLOORING is used for lighter traffic and for verandahs and balconies where waterproof floor coverings are essential.







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DAMPPROOFING

Materials

The easy method of "ready to roll" asphaltic damp courses has now superseded the old time method of tile, slate or tar and sand on account of the speedy laying and consequent cheaper installation costs provided by the former

"Oral" Ledcore Dampcourse

A special high-grade and permanently waterproof dampcourse consisting of a lead centre with a coating of asphaltic mastic on both sides which protects the lead against any chemical action of the mortars. It will not corrode nor squeeze out Approved by Government authorities.

Sizes. Supplied in two thicknesses 1 lb. lead and 2 lb. lead centres, in 20 ft. rolls, 4½, 9, 13½ in., and all brick sizes up to 31½ in. wide

Finished Weights.—1 lb. lead centre, 13 lbs. per sq. yd.; 2 lb lead centre, 22 lbs. per sq. yd.

"Ormonoid" Dampcourse

"Ormonoid" 3-ply dampcourse is made from heavy 3 ply bitumen fabric possessing strength enough to resist any required tensional or compressional stress. It will not squeeze out, yet is sufficiently flexible to conform to unevenness in the walling or ordinary wall settlement without fracture. It is permanently damp proof and not affected by lime or cement.

Sizes.—In rolls 72 ft. long, 4½, 9, 13½ in. and all brick sizes up to 36 in wide

Weight.—4½ lbs. per sq. yd.

"Oral" Natural Asphalt Dampcourse

Is a good quality, waterproof pliable and durable dampcourse which will not squeeze nor fracture. Designed to meet the requirements of dampcoursing with natural asphalts ready to use, and thus obviating mixing on site. Approved by Government authorities.

Sizes.—Rolls 30 ft. long, 4½, 9, 13½ in. and all brick sizes to 35½ in. wide.

Weight.—8 lbs. per sq. yd.

DAMPPROOFING

Application

Damp proofing is protection against moisture. It is the prevention of dampness or condensation appearing in the surface of walls or floors. Waterproofing is the protection adopted when there is seepage or actual water pressure present.

Foundations—In order to prevent dampness rising to the floor level, horizontal dampcourses must be placed below the floor plate level. 'Ormonoid" and 'Oral" dampcourses are simply unrolled on to the foundations and a minimum lap of 3 ins. made at the end of each length. No sealing is necessary at the joints, the weight of the next course of the brickwork keeps it in place.

Vertical Dampcourses—Vertical dampcourses are most effective when built in between an outer or inner 4½ ins. brick wall (in Portland cement mortar) against the main wall The dampcourse should be carried down from the level of the horizontal dampcourse, carried under wall thickness and basement floor, lapped 3 ins., and mopped with hot asphalt at joints.

Parapets—So as to prevent any possibility of dampness descending down past the dampcourse, it is recommended that the dampcourse material be carried out through the wall and turned down ½ in. on outside wall as shown in the Sketch No. 6. This sketch also shows the 'Ormonoid' acting as a flashing to Ormonoid roofing

Recommendations

"ORAL" LEDCORE, composed as it is with ideal damp-proofing materials — asphalt and lead—is recommended for use in all first class work.

"ORMONOID" 3 PLY is thoroughly reliable, too, as its many installations testify.

"ORAL" NATURAL ASPHALT DAMPCOURSES are frequently used where natural asphalts, which incorporate mineral constituents, are required, being ready in rolls, they displace hand trowelling.

WATERPROOFING

Materials

The Membrane Method

A membranous covering of waterproofing asphalt, reinforced with asphaltic fabric, is strong and flexible and has the necessary characteristics to resist water pressure and bridge hair cracks in the concrete due to temperature changes. The membrane is built up in as many plys of fabric as are necessary to meet the waterproofing requirements

"Dampax" Waterproofing, Sheeting and Dampcourse

This material is composed of high melting, pliable asphalts with a woven fabric centre. It will not crack nor soften under extreme conditions. Strongly recommended for vertical or horizontal permanent waterproofing in footings, basements, bridges, viaducts. Extremely useful in waterproofing walls and roofs of garages that are cut into steep sites where it is required to continue lawn or garden over concrete roof

Sizes.—Rolls 24 ft long, ⅛ in. thick Weight, approximately 7 lbs. per sq. yd.

Widths. 4½, 9, 13½, 18, 36 ins.

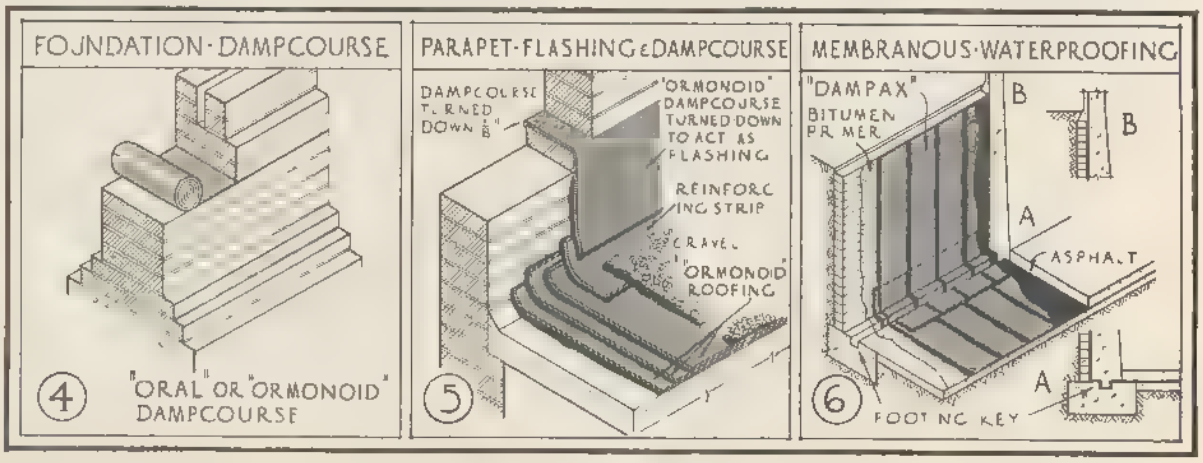
Application (see sketch No. 6)

Each job of waterproofing is a problem in itself and the methods of applying "Dampax' depends on local conditions We recommend that we be consulted in each particular case where a waterproofing problem presents itself

Sketch No. 6 shows an application to a basement. Here it has been impossible to work outside the wall, so a 4½ ins brick wall in Portland cement mortar has been erected and the membrane waterproofing applied to it. The concrete retaining wall is designed to hold existing pressure.

It is recommended that a priming coat of "Ormonoid' Bitumen Paint be applied to the concrete or brick surface that is to be waterproofed. This prepares it for the asphaltic coatings to follow

Hot asphalt, heated to 350 degrees F., is applied to the primary coat and is used to cement together into one composite sheet the number of layers of "Dampax' that may be required.



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LININGS

"Oral" Asphalt Saturated Felt

Made from selected high-grade rag felts and best-quality refined asphalts. Flexible, untearable, vermin-proof, inodorous and permanently waterproof, besides being a most efficient non-conductor and insulator.

Sizes.—No. 12, medium, 167 × 3 ft., covers 500 sq. ft. No. 15, heavy, 108 × 3 ft., covers 324 sq. ft.

Weight.—No. 12, 47 lbs. per roll. No. 15, 46 lbs. per roll.

Uses.—For lining and insulating against heat, cold, sound or moisture, providing dust proofing to weatherboards, walls, ceilings and floors. Especially adapted for insulating warehouses, refrigerators, ice-houses, etc.

Application—(See Sketch No. 7)

"Oral" Asphalt Saturated Felt can be applied at the lowest labour costs. It goes around corners without cracking, can be cut easily with an ordinary knife, and stretched from rafter to rafter, joist to joist or stud to stud without the use of wood underlinings. When used under Marseilles tiles it is necessary to fit the battens on top of the felt in order to wire the tiles above the surface of the felt and avoid injury during wiring.

In refrigerator and cold-storage work, the high insulating value of "Oral" Saturated Felt assists the main insulating material. Its moisture-proofing qualities enable it to keep moisture content of walls down to a minimum, and its non-integrating properties in the presence of low temperature is of much importance. It is definitely inodorous.

"Tensite" Building Paper

A building paper asphalt saturated right through which forms a barrier against the passage of moisture, dust and cold air. Used for many purposes where tough lightweight, insulating wall and floor linings are required. Excellent for use under linoleum.

Sizes.—No. 7, in rolls, 333 × 3 ft., covering 1000 sq. ft.

Weight.—52 lbs. per roll.

UNDERLAYERS

"Oral" Sarking Felt

An extra heavy saturated felt made from superior wool and cotton, waterproofed by high-grade asphalts.

Sizes.—No. 37, 66 × 3 ft., covers 200 sq. ft.

Weight.—60 lbs. per roll.

Uses.—"Oral" Sarking Felt is recommended for insulating, soundproofing and waterproofing at floors, walls, ceilings, under roofings, etc., where more extreme conditions are encountered than in the cases where "Oral" Saturated Felt would be normally used. One of its greatest uses is in its application as an anti-squeak packing to the structural joints of bridges, ramps, wharves and other timber constructions subjected to heavy traffic. Laid between floors and ceilings, it provides an excellent sound deadening medium which is so desirable in hotels and apartment-houses.

Application—(See Sketch No. 8)

'Oral' Sarking Felt is applied the same as "Oral Saturated Felt. Sketch No. 8 shows its application as an anti-squeak precaution to timber construction. Squeaks and noises that would ordinarily occur at the joints of the structural members moving under traffic are eliminated by the flexibility and toughness of 'Oral' Sarking Felt.

WATERPROOF PAINTING

"Ormonoid" Bitumen Paint

A high-grade Bitumen Paint made from specially-blended materials for painting "Ormonoid" and similar roofings and floorings. Recommended for waterproofing and weather-resisting for steel, concrete, brick, wood, galvanised iron and cement. Does not affect drinking water. Available in two colours, red and black.

"Ormonoid" Bitumen Paint is of the consistency to permit application with a brush.

JOINTING

"Givantake" Asphalt Expansion Jointing

Specially designed for the purpose of taking up expansion and contraction and maintaining watertight joints in concrete roads and pavements. As supplied to, and in strict uniformity with, the specification of the Main Roads Boards.

"Givantake" Jointing is composed of a cork filler with saturated felt on both sides, making an exceedingly resilient body. It contains no mineral matter or other adulterate, and is firm in hot, and plastic in cold, climates. It is enduring as long as the concrete it protects; it prevents uncontrolled cracking and thus reduces maintenance.

Sizes. Made to any size and specification.

Application—(See Sketch No. 9)

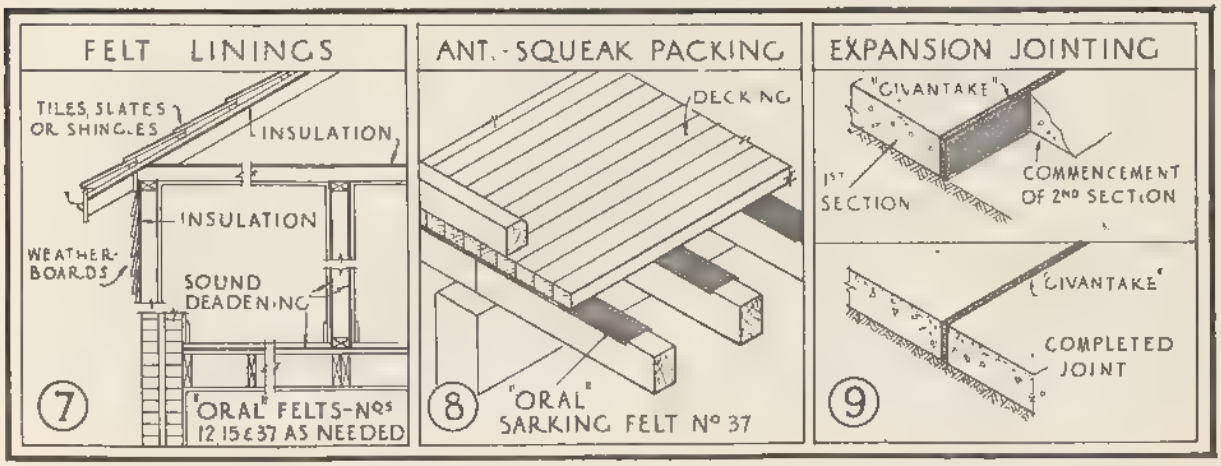
Application is simple, and the road construction is facilitated. The rigid form of 'Givantake' enables it to be placed at the end of each section of concrete immediately before the next section is poured. There is not the trouble of removing the forms, priming the sides of concrete and heating of compounds, which is involved in most methods of compound expansion jointings.

CAULKING

"Duraseal" Plastic

A bitumen asbestos compound for stopping leaks, plugging cracks and holes and waterproofing lead flashings, chimneys, parapet walls, concrete paths, tile and galvanised iron roofs, and brickwork. Recommended for use in place of coloured Portland cement in pointing up tile roofs.

Colours.—Red and black. In tins ready for use. Used in a similar manner to putty. Full directions on tin.



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12*b*	PABCO PRODUCTS (AUSTRALIA) LIMITED	MALTHOID
S.A.A. File No.	REGISTERED OFFICE: 26 JAMIESON STREET, SYDNEY	

MALTHOID ROOFING AND BASEMENT WATERPROOFING

Genuine Malthoid Roofing has been used throughout Australia by leading Architects and Engineers for 25 years. Malthoid has been selected for more prominent buildings throughout the Commonwealth than any other fabric.

Malthoid Roofing is manufactured under the strictest laboratory supervision, four separate laboratories located throughout the factory testing its ingredients and the finished product, all the constituent parts being manufactured by the one company at one factory, assuring Architects of positive uniformity in waterproofness and maintained quality. Malthoid is not the same as others. It is manufactured to a distinctly different formula which has given favourable results for over 25 years in Australia which proves it to be dependable waterproofing.

The blended coating used on Genuine Malthoid, composed of various grades of Floatine (a special waterproofing asphalt) is only produced by the manufacturers of Malthoid, who are the first commercial users of a refined pure petroleum asphalt. The distinction between Floatine, a special pure petroleum waterproofing asphalt, and native asphalts, etc., is fully described in a special booklet which will be gladly sent to the profession upon request.

Qualities of Floatine

Floatine has proven itself in Australia, in tropical countries, and in Arctic countries, as unsurpassed for waterproofing purposes. It is refined by us in our own refinery under the supervision of men who have spent their lives studying and refining waterproofing asphalts. The unequalled qualities of Floatine are described in a pamphlet which we will gladly send to the profession to complete their files.

List of Products

Malthoid Roofing
- „ Floor Covering
- „ Basement Waterproofing

Pabco Asphalt Saturated Felt
- „ Fibre Roof Coating, heavy

Floatine Special Waterproofing Asphalt

P. & B. Preservative Paint, acid proof, waterproof.

Genuine Malthoid is branded with the Registered Malthoid Trade Mark.

Standard Waterproofing

Malthoid Standard Waterproofing Specifications have been the standard in Australia for built-up roofs for many, many years. Nothing speaks higher than this for reasons why Malthoid alone should be used where dependable permanent waterproofing is desired.

Malthoid Standard Waterproofing Specifications are waterproof, light in weight, long-wearing and dependable. In every large city in the Commonwealth there are expert Application Agents for applying Malthoid Standard Waterproofing Specifications.

Service to Architects

Waterproofing problems are many and varied. The manufacturers maintain a staff in Australia who have had long years of experience in waterproofing problems both here and abroad. The Application Agents of Malthoid Waterproofing Specifications have had years of experience in applying these specifications under normal and abnormal conditions. Practical assistance is offered to the profession by either of these two sources of specialised knowledge without any obligation to the architect, owner or contractor.

WEIGHTS AND COVERING CAPACITIES OF ROOFING MATERIALS

ROOFING

Malthoid Roofing is made in five weights:—

½-ply	averages 52 lbs. per roll
1-ply	averages 88 lbs. per roll
2-ply	averages 110 lbs. per roll
3-ply	averages 126 lbs. per roll
5-ply (extra heavy)	averages 145 lbs. per roll

A roll of Malthoid is 3 ft. wide and 72 ft. long (containing 216 sq. ft.) with the exception of 5-ply Extra Heavy, which is 75 ft. long (containing 225 sq. ft.).

FELT

Pabco Asphalt Saturated Felt is made in two weights:-

No. 2	averages 43 lbs. per roll 36 in. wide
No. 3	averages 50 lbs. per roll, 36 in. wide

No. 2 contains 324 sq. ft., and No. 3 contains 500 sq. ft. to the roll. The No. 2 weight is that most generally used in Australia.

FLOATINE

Floatine Special Waterproofing Asphalt is supplied in drums containing approximately 400 lbs. nett.

(Continued on next page)

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Brisbane City Town Hall.
Architects
Messrs. T. R. Hall and G. G. Prentice.
Builder:
D. D. Carrick.

4,500 square yards of Flat Roofs covered with "A" Specification Malthoid.

MALTHOID STANDARD WATERPROOFING SPECIFICATIONS

For Waterproofing Flat Roofs

Specification "A."

1st layer—Genuine Malthoid Roofing One-ply
2nd layer—Flooded with Floatine (Special Asphalt)
3rd layer—Genuine Malthoid Roofing Two-ply
4th layer—Flooded with Floatine (Special Asphalt)
5th layer—Genuine Malthoid Roofing Three-ply
6th layer—Flooded with Floatine (Special Asphalt)
7th layer—Gravel Embedded in Floatine

Specification "B."

1st layer—Pabco Felt
2nd layer—Flooded with Floatine (Special Asphalt)
3rd layer—Pabco Felt
4th layer—Flooded with Floatine (Special Asphalt)
5th layer—Genuine Malthoid Three-ply
6th layer—Flooded with Floatine (Special Asphalt)
7th layer—Gravel Embedded in Floatine

Specification "C."

1st layer—Genuine Malthoid Two-ply
2nd layer—Flooded with Floatine (Special Asphalt)
3rd layer—Genuine Malthoid Extra Heavy (Five-ply)
4th layer—Flooded with Floatine (Special Asphalt)
5th layer—Gravel Embedded in Floatine

Specification "CX."

1st layer—Genuine Malthoid One-ply
2nd layer—Flooded with Floatine (Special Asphalt)
3rd layer—Genuine Malthoid Three-ply
4th layer—Flooded with Floatine (Special Asphalt)
5th layer—Gravel Embedded in Floatine

Specification "CY."

1st layer—Genuine Malthoid Two-ply
2nd layer—Flooded with Floatine (Special Asphalt)
3rd layer—Genuine Malthoid Three-ply
4th layer—Flooded with Floatine (Special Asphalt)
5th layer—Gravel Embedded in Floatine

For Waterproofing Basements and Reservoirs

Specification "CZ."

1st layer—Flood Coat Floatine (Special Asphalt)
2nd layer Genuine Malthoid Standard Dampcourse
3rd layer—Flood Coat Floatine (Special Asphalt)
4th layer—Genuine Malthoid Standard Dampcourse
5th layer—Flood Coat Floatine (Special Asphalt)

For Waterproofing Sloping Roofs

Specification "D."

1st layer—Genuine Malthoid One-ply
2nd layer—Flooded with Floatine (Special Asphalt)
3rd layer—Genuine Malthoid Two-ply, painted red, green or black

Specification "E."

1st layer—Pabco Felt
2nd layer—Flooded with Floatine (Special Asphalt)
3rd layer—Genuine Malthoid Three-ply
4th layer—Flooded with Floatine (Special Asphalt)
5th layer—Gravel Embedded in Floatine

For Waterproof Lining under Tiles

Specification "F."

Genuine Malthoid One-ply laid over rafters on which purlins and tile battens are affixed.

(Continued on next page)

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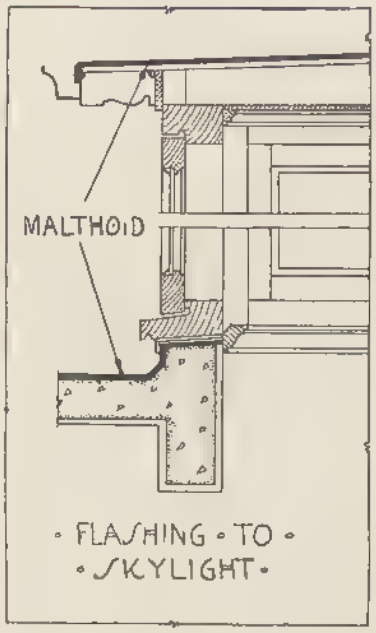
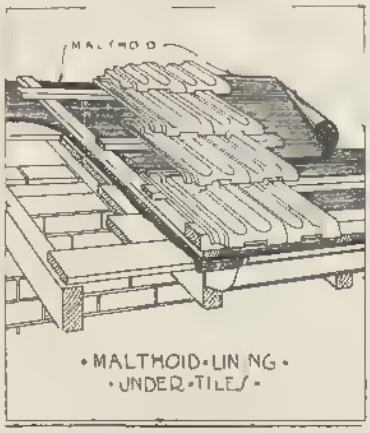
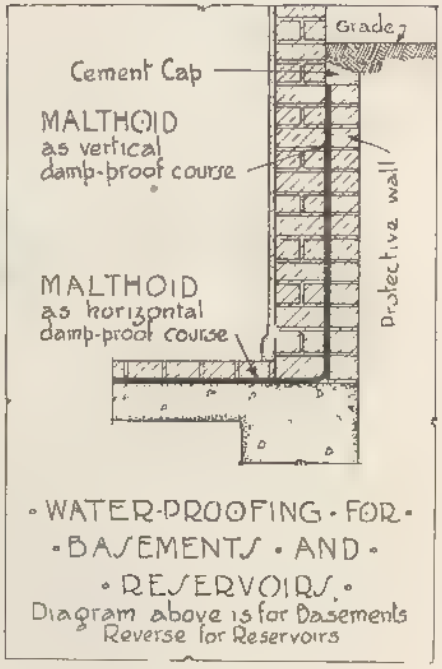




THREE TYPICAL APPLICATIONS OF MALTHOID.



Pabco Industrial Roofing White (Finley Type)

This material is similar to genuine Malthoid, but the side to be exposed to the weather is surfaced mechanically during manufacture with a mineral finish consisting of white porcelain granules. Pabco Industrial Roofing, porcelain finish, is manufactured in the following weights.

Average 85 lbs. per roll—3 ft. wide and 36 ft. long, containing 108 sq. ft., or sufficient to cover 100 sq. ft. of roof area

Average 105 lbs. per roll—3 ft. wide and 36 ft long, containing 108 sq. ft., or sufficient to cover 100 sq. ft. of roof area

Complete details regarding the adaption of this Roofing to particular industrial building conditions will be gladly furnished by us, particularly where the question of reduction of inside temperature is a decided feature or where the reflection of sunlight from roofs through windows, such as of a saw-tooth roof, is desired, in addition to long years of permanent waterproofing service.

Basement Waterproofing

Waterproofing Basements and Reservoirs usually requires special detailed specification to suit peculiarities usually found on every job such as varying water pressures, water levels, etc. The specification listed on the preceding page, Specification "CZ," will generally be found sufficient; but it is recommended to the profession that they call for the free service of one of the manufacturers' representatives to advise them should they have special difficulties to overcome in any of their basement or reservoir waterproofing.

Should a basement waterproofing fail it is quite often impossible to remedy it, or if a remedy is possible it is usually a most expensive one. For this reason the manufacturers of Malthoid respectfully suggest to the profession that they be given the opportunity of personally placing before the profession the benefit of their world-wide experience in this particular class of waterproofing.

EXTRA HEAVY MALTHOID FLOOR COVERING

A sturdy floor covering to protect every type of floor

Extra heavy Malthoid, equal in thickness to five-ply, wears much longer than linoleum on wood or concrete floors. At a cost surprisingly low you can replace frayed linoleum with this sturdy Malthoid fabric

Government office, warehouse, merchant's office and public building floors in Australia and New Zealand have been covered with Malthoid since 1904, and there have been surprisingly few replacements.

Strips of Malthoid are three feet wide and 75 feet long. This great length is an advantage when laying the fabric in halls When entirely covering a floor, fit the Malthoid with a slight gap between strips, just as linoleum is laid; this permits it to spread without subsequent wrinkling; or, better still, seal it to the floor with special asphaltic cement. The edges of Malthoid in contact under traffic fit so closely that the joints will gradually become invisible.

Rolls of Malthoid Floor Covering are strongly wrapped for despatch from ports to inland towns. The weight per roll of 225 square feet (25 square yards) is 145 pounds. Best results are attained when floor covering is laid over smooth boards or concrete without deep cracks.

(Continued on next page)

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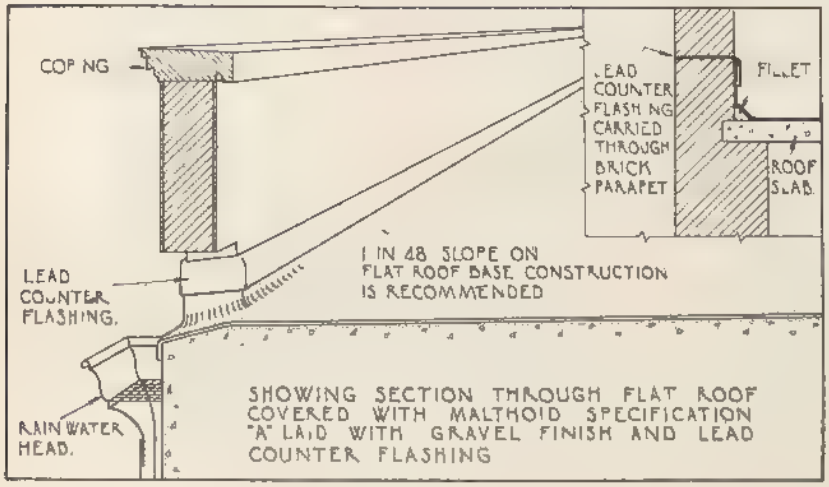
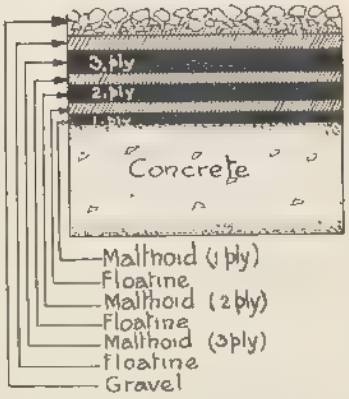


·CROSS·SECTION·OF·
·MALTHOID·
SPECIFICATION·"A"·
·FOR·WATERPROOFING·
·FLAT·ROOFS·



AUSTRALIAN-MADE PRODUCTS
FOR PABCO PRODUCTS (AUST.) LIMITED

We are pleased to announce to the architectural profession and building industry in general that we now have to offer the Australian-made products listed hereunder. Supplies are available from our distributors in Brisbane, Sydney, Melbourne, Adelaide, Perth and Hobart.

Duraloid Roofing

A superior Australian-made roofing, composed of tough and carefully prepared felt, saturated and finished with a special bituminous water-proofing compound. Thoroughly waterproof and totally resistant to the action of acids, fumes and salt air

Asphaloid Roofing

A good quality bitumen roofing made from thoroughly reliable materials which are selected with the same care and attention as for Duraloid It is tough, durable and waterproof and may be used on all classes of buildings.

Duraloid Dampcourse

A superior bituminous dampcourse in roll form cut to the usual wall widths from 4½ in. to 36 in. wide. Permanently damp resisting and not affected by lime or cements. Guaranteed not to fracture or deteriorate.

Asphaloid Dampcourse

A good quality dampcourse. Damp-proof, and immune from the defect of squeezing out under heat or pressure, it will give every satisfaction.

Duraloid Floor Covering

A fine Australian made flooring suitable for use in all classes of buildings where heavy wear is to be encountered Will not harbour vermin, and is damp-proof, waterproof, and acid-proof

Duraloid Asphalt Saturated Felt

Composed of selected rag felts and asphalts. Water, rot and vermin proof, it is suitable for linings under roofings, and to walls, floors, ceilings, etc.

Duraloid Roof Coating

The better coating for all felt roofs.

Asbestoid, Fibre Roof Coating

For felt and iron roofs A plastic compound of heavy body for durable results. To be applied with a brush.

Duraloid Black Adhesive

Highest quality genuine adhesive for cementing roofings, linos, etc.

Asbestoseal

A heavy mastic—stops leaks Will stop leaks anywhere at any time in chimney flashings, brickwork, iron roofs, felt roofs, slates, tiles, etc. Apply with a putty knife

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

12b

S.A.A. File No

MAXWELL PORTER & SON LTD.

MANUFACTURERS OF "BITUMENOID"

107 REDFERN STREET, WATERLOO, N.S.W.

TELEPHONES: OFFICES M.3157, FACTORY: M A.3686

"Bitumenoid"

BITUMENOID

[*"Bitumenoid" products are available in all States of the Commonwealth. Write Maxwell, Porter & Son Ltd. for further information.*]

Bitumenoid Products

"Bitumenoid" Roofing, Flooring, Dampcourses, Waterproof Sheeting, Asphalt Saturated Felt, Sarking Felt, Building Paper, Roofing Cement, Bitumen Paint, Asbestos Compound, Expansion Road Jointing for Concrete roads and pavements.

Manufacture—Laying

"Bituminoid" Products are manufactured on the most up-to-date plant in Australia for this class of goods, from the best grade of raw material, under the supervision of experts.

Our organization specially formed for the laying of "Bitumenoid" Roofs is at your service at nominal rates. The skilled workmen of this department are specially selected for their ability, and we are able to guarantee the quality of their work. In addition to laying Bitumenoid Roofs, we undertake the repair work involved in troublesome roofs of every description.

Bitumenoid Roofing

"Bitumenoid" is a waterproof and weatherproof Roofing composed of carefully prepared rag felts, saturated with proper refined and tempered asphalts, which will not dry out or evaporate in any climate, and coated with a permanent asphaltic composition which adequately seals the saturated felt and imparts a distinctive finish "Bitumenoid" is proof against the action of acids, sulphurous and other fumes, is an exceedingly good non-conductor, and will not contaminate rain water, which may be drained from "Bitumenoid" covered roofs for use as drinking water.

"Bitumenoid" Roofing is suitable for either flat or pitched roofs It is made in 4 thicknesses in rolls of 72 ft. x 3 ft., which covers 216 sq. ft., allowing for 2 in. laps. Every roll bears the trade mark.

"BITUMENOID"—your protection and our guarantee

RECOMMENDED USE OF WEIGHTS

1 ply—64 lbs. per roll	For temporary work, linings under tiles, etc., and first layer work on flat roofs.
2 ply—84 lbs. per roll 3 ply—104 lbs. per roll 5 ply—Extra heavy, Mica finish, 124 lbs. per roll	For built up specifications for flat roofs, waterproofing, all types of wood and concrete roofs, and for good serviceable floor coverings, linings, etc.

RECOMMENDED FLAT ROOF SPECIFICATION

For a built-up roof providing maximum service and trouble-free life, we recommend the following:

1 Layer of 1-ply "Bitumenoid" Roofing
1 Layer of 2-ply "Bitumenoid" Roofing
1 Layer of 3-ply "Bitumenoid" Roofing

each laid in flood mopping of 30 lbs. per 100 sq. ft. hot asphalt (including the first layer mopped to roof surface) and finished with 1 layer of screened gravel embedded in a heavy mopping of hot asphalt.

"Bitumenoid" Roofing laid as above, but without the gravel finish, is also exceedingly efficient, but undoubtedly the gravel application provides that extra protection which will give years of service without maintenance expenses.

A good alternative is obtained by periodical application of "Bitumenoid" Asbestos Compound or "Bitumenoid" Bitumen Paint

Bitumenoid Flooring

This material is eminently suitable for covering wood or concrete floors subjected to hard wearing service. "Bitumenoid" Flooring will not harbour vermin, and is damp, water, acid and alkali proof. It is a non-conductor, odourless, deadens sound, and is particularly suitable for laboratories, shops, schools, public buildings, warehouses, etc

"Bitumenoid" Flooring is made in 3 weights in rolls of 72 ft. x 3 ft. covering 216 sq. ft. floor area.

Grey colour, extra heavy, 5-ply Mica finish, 124 lbs. per roll.
Red colour, extra heavy, smooth surface, 124 lbs. per roll.
Red colour, medium, smooth surface, 95 lbs. per roll.

Extra heavy grey 5-ply is frequently used on concrete floors under linoleum to prevent damp penetrating through and rotting the linoleum. "Bitumenoid" Flooring can be laid like linoleum or sealed to floors with "Bitumenoid" asphaltic cement.

Bitumenoid 3-ply Dampcourse

This is a thoroughly reliable heavy 3-ply asphaltic dampcourse, completely impervious to moisture, unaffected by lime or cement mortars in contact with them, and totally free from the defect of squeezing out when under the influence of pressure or heat. It contains no coal tar, pitch or other short-lived materials.

In rolls of 72 ft. by any width up to 36 ins. Weight, 4½ lbs. per sq yard.

Bitumenoid Ledcore Dampcourse

"Bitumenoid" Ledcore Dampcourse is composite in character, consisting of a sheet of laminated lead covered on both sides with best quality bitumen of tense and tough, yet pliable, nature It is unaffected by extremes of temperature, and from the very nature of its component parts it is absolutely permanent and impervious. The lead is specially manufactured for use in continuous rolls, and there is consequently no break in the lead itself, which is protected by the refined bitumen.

In rolls 20 ft. long to suit all widths up to 31½ ins.

Weight, 1 lb. lead centre, 13 lbs. per sq. yard; 2 lbs. lead centre, 22 lbs. per sq. yard.

"BITUMENOID" ROOFING CEMENT

A highly adhesive liquid cement made specially for sealing and fixing asphalt roofings and floorings. Supplied ready for use and applied cold

(Continued on next page)

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

Bitumenoid Natural Asphalt Dampcourse

This is a durable material made from best quality bitumen. It is waterproof and dampproof, and approved by the N.S.W. Department of Public Health to comply with Local Government Ordinances. Recommended for use in small houses and similar constructions where costs are to be kept to a minimum

Rolls, 30 ft. long by any brick width up to 35½ ins.
Weight, 8 lbs. per sq. yard

Bitumenoid Waterproof Sheeting

This waterproof sheeting is made from best quality bitumen held between felt on one side, and woven fabric on the other side. It is tough, elastic, and pliable in all temperatures. It is adaptable for all vertical or horizontal waterproof treatments and is eminently suitable for use under concrete roads on composite bridges

In rolls, 20 ft. long, and widths of 4½, 9, 13½, 18, 36 ins.
Weight, approx. 7 lbs. per sq. yard.

The usual application of the sheeting in most waterproofing problems is in the form of a built-up blanket, consisting of as many layers as necessary to meet the conditions, mopped together with hot asphalt and applied so as to envelop or cover the portion of the structure to be waterproofed

Bitumenoid Sarking Felt

This is a heavier Asphalt Saturated Felt used for all purposes where a sturdy waterproof, verminproof, dustproof, insulating and sound-deadening lining for floors partitions, ceilings and roofs is required. It also forms an ideal cushion between the structural member of timber bridge, wharf, and other heavy construction, and is extensively used under linoleum and other floor coverings

In rolls of 66 ft. x 3 ft., covering 200 sq. ft.
No. 37, 5-ply, extra heavy, approx. 60 lbs. per roll.
No. 25, 3-ply, heavy, approx. 35 lbs. per roll

Bitumenoid Saturated Felt

"Bitumenoid" Felt is made from best quality rag felts saturated with bitumen. They are waterproof, verminproof, odourless, untearable and highly recommended for us in all wood-frame buildings as linings for the prevention of draughts from the floors, ceilings or walls, and for use under tiles and slates as a preventative of drift during hurricane weather

No. 12, medium, in rolls of 167 ft. x 3 ft., covering 500 sq. ft.
No. 15, heavy, in rolls of 108 ft. x 3 ft., covering 324 sq. ft.

Bitumenoid Building Paper

"Bitumenoid" Building Paper is saturated in best quality bitumen and is suitable for conditions requiring an inexpensive, light and serviceable lining to prevent the infiltration of cold air and dust

In rolls of 333 ft. x 3 ft., covering 1,000 sq. ft., and weighing approx. 52 lbs. per roll.

Bitumenoid Expansion Road Jointing

A Concrete road joining composed of best quality asphalt saturated felts into which is sandwiched a granulated cork filling, giving the jointing an unequalled elasticity and absorption power against the compression and expansion movements of the concrete.

Supplied to the Public Works Department, Main Roads Board and numerous concrete road contractors.

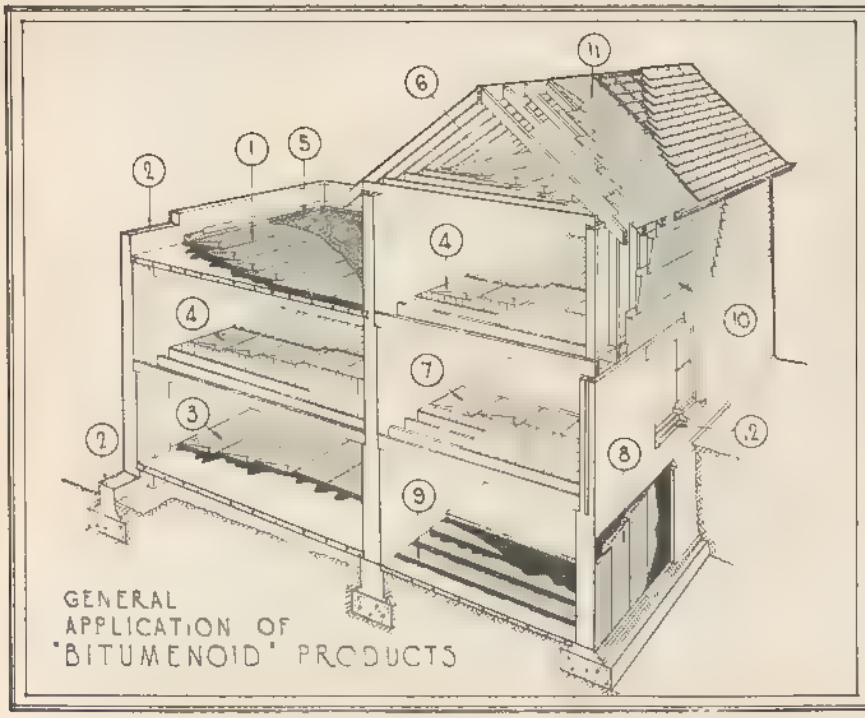
Sizes: ¼, ⅜, ½, ¾, 1, 1¼, 1½ inches thick.

"BITUMENOID" BITUMEN PAINT

A composite paint made from the highest grade bitumen and other specially blended materials. It is suitable for painting "Bitumenoid" and other bitumenous roofs and floorings, and is largely used for the prevention of rust in galvanised roofings. It also forms a protection for brick cement and steel surfaces. It does not contaminate drinking water. In tins ready for use. Colours Red and Black. One gallon covers approximately 60 to 80 square yards of "Bitumenoid" Roofing

"BITUMENOID" ASBESTOS COMPOUND

Composed of asbestos fibres and bitumen, it is immune to all destructive agencies to which any surface can be exposed. It has a tough, elastic consistency, expanding and contracting perfectly under all conditions. Recommended for the protection and preservation of all bitumen and galvanised iron roofs. In tins ready for use. Colours: Red and Black.



GENERAL APPLICATION OF "BITUMENOID" PRODUCTS.

Products Shown on Drawing.

1. "Bitumenoid" Roofing — Waterproof and Weatherproof
2. "Bitumenoid" Dampcourses Impervious to moisture.
3. "Bitumenoid" Flooring — For hard service conditions.
4. "Bitumenoid" Sarking Felt —Sound Deadening between floors
5. "Bitumenoid" Paint or Asbestos Compound
6. "Bitumenoid" Asphalt Saturated Felt or Building Paper—For insulating and preventing draughts.
7. "Bitumenoid" Asphalt Saturated Felt or "Sarking" Felt under linoleum
8. "Bitumenoid" Waterproof Sheeting built up in membraneous form to waterproofing basement wall
9. "Bitumenoid" Waterproof Sheeting in membraneous form under basement floor slab.
10. "Bitumenoid" Asphalt Saturated Felt or Building Paper under weather boards for insulating and preventing the infiltration of dust
11. "Bitumenoid" Asphalt Saturated Felt under roofing tiles to prevent passage of drift during hurricane weather
12. "Bitumenoid" Saturated Felt under sills in cavity wall

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

12e

S.A.A. File No.

MAXWELL PORTER & SON LTD.

MANUFACTURERS OF ROOFING TILES

107 REDFERN STREET, WATERLOO, N.S.W.

TELEPHONE M.3157

ROOFING TILES

[For Other Products, See Index]

Products

Terra Cotta Marseilles Tiles.
Patented Interlocking Terra Cotta Spanish Tiles.
Terra Cotta Roofing Accessories.
Roofing Slates.

Estimates—Service

Estimates for fixing Maxwell Porter's Terra Cotta Tile Roofs complete in Sydney and suburbs will be given on request. Advice pertaining to the selection of tiles and their transportation to other parts of the State is at your service.

This well-designed Spanish Residence in a Sydney suburb is roofed with Porter's Patented Interlocking Tiles.

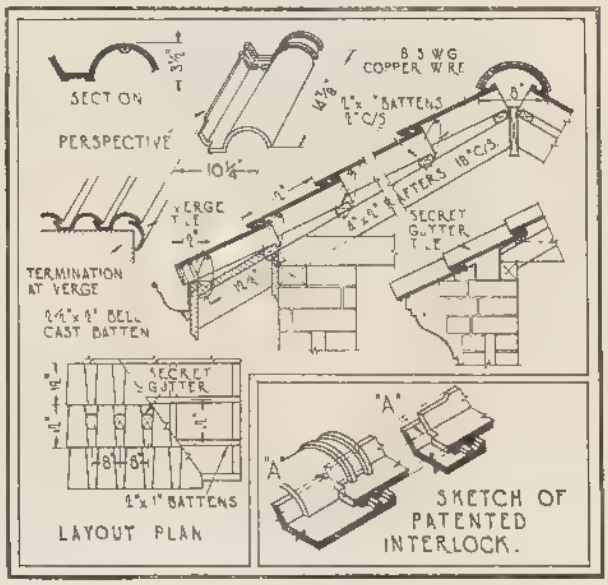
(See drawing below for details)

General

Maxwell Porter's Terra Cotta Roofing Tiles have all the characteristics of first-class roofing tiles on account of their hard body, toughness, freedom from warping, low porosity, and accuracy of shape. They have a good ring when struck, and their durability is unquestionable.

Colours range from the the usual reds and browns to a variety of autumn colours which produce beautiful blended effects so desirable in various types of domestic roofs

Glazed and semi-glazed tiles are also available They are vitrified on the exposed surface, which prevents moisture absorption and permits the drainage of rainwater from the roofs in country districts for domestic purposes.



Details of Porter's Patent Interlocking Spanish Tile

Porter's Patented Interlocking Spanish Tiles

Because of the following reasons, this interlocking tile (see drawing) provides a definite advantage over the usual Spanish Mission tile with the semi-circular section:

1. The simple cross battening eliminates all roof boarding and vertical battens usually required for support and fixing the semi-circular tiles.
2. The patented interlock and cross section of the tile permits speedier placing and fixing.
3. The interlock securely holds the adjacent tiles in position on all four sides
4. Considerably less number of tiles are required per square.

Roofing Slates

We have available a stock of best quality Roofing Slates suitable for repairing existing roofs or for entirely covering new roofs.

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

WUNDERLICH LIMITED

Manufacturers of

Terra Cotta Roofing Tiles

Administration: BAPTIST STREET, REDFERN, SYDNEY, N.S.W

Showrooms and Offices:

SYDNEY: Baptist Street, Redfern.
STH MELBOURNE: 210 Hanna Street.
ADELAIDE: Grote and Morphett Streets.
PERTH: Lord and Short Streets.
BRISBANE: Amelia Street, Valley.
NEWCASTLE: Builders' Exchange, King St.
HOBART: 139 Macquarie Street.
LAUNCESTON: 71 St. John Street

12e

S.A.A. File No.

[For Other Products, See Index]

Products

Terra Cotta Tiles of various patterns, including the well-known Marseille pattern; and Shingle, Cordova (parallel sides), Mission large and Mission small (tapered sides), Italian, and Spanish-American.

Colours

The colours comprise the familiar shades of red and chocolate, also numerous effects in glazed and semi-glazed finishes. These provide scope for roofing treatments of either rich individual colours or else intermingled shades producing an harmonious blending of bright colouring

Accessories

Ridging, Finials and Cresting, in colours and glazes to match the Tiles, are available in a variety of sizes and patterns.

Qualities and Advantages

Wunderlich Terra Cotta Roofing Tiles are renowned for their extreme hardness, trueness to shape and size, and wide variety of colours and patterns. Their prolific use throughout the Commonwealth is conclusive evidence as to the advantages they offer. Not only are they much more attractive than other types of roofing, but they retain this quality indefinitely, and outlast the structures they grace. There is no upkeep cost.

Marseille Pattern Wunderlich Tiles.

Below—Wunderlich Cordova Tiles (Chocolate Colour).

Glazed Tiles for Country Homes

For Country homes, where the conservation of every drop of rain water is a consideration, we offer glazed and semi-glazed Tiles, which are virtually non-absorbent.

Experience and Facilities

There is a Wunderlich plant for the manufacture of Terra Cotta Roofing Tiles in every State, with the exception of Tasmania, where, however, ample stocks are maintained. We are the largest manufacturers of these Tiles in the Southern Hemisphere.

Methods of Fixing

On account of the slight variations in sizes of Tiles manufactured by the various Wunderlich plants, it is not possible to provide reliable data here as to spacing of battens or methods of fixing, but complete information will be supplied by our nearest Sales office, on request

(Continued on next page)

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Correct Lengths of Rafters

A saving in labour is effected, and a more secure roof results, if the rafters are cut to a length that will permit of the use of whole (or uncut) Tiles for the last row finishing at the ridge. On application, we will provide a "rafter card" giving the correct lengths of rafters according to the number of rows of Marseille pattern Tiles the roof involves.

Estimates for Roofs—Fixed

Quotations for roofs of Wunderlich Tiles, fixed complete in any part of the Commonwealth, will be furnished on request

Sample-Board Displays

Show Boards displaying sample roofs are on view at the Showroom or Works in every State. These Boards embrace a wide range of colours and patterns, enabling the architect to make his selection under ideal conditions

Booklet in Colours

Our Booklet, "Roofs of Tile," providing illustrations in colours of Wunderlich Tile Roofs, will be sent, post free, to any architect or builder enquiring

A masterpiece of colour and texture—this roof of Wunderlich Colour-Blend Tiles, Cordova Pattern.

There is refinement in a treatment with Wunderlich Shingle-Pattern Terra Cotta Tiles of intermingled colours; in marked contrast with the rugged beauty of Cordova and Mission Pattern Tiles.

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

JOHN LYSAGHT (AUST.) LTD.

SYDNEY - MELBOURNE - ADELAIDE
BRISBANE - FREMANTLE
Works: NEWCASTLE, N.S.W.

ORB GALVANIZED SHEETS

12c
S.A.A. File No.

HISTORY

Lysaght's Newcastle Works were erected in 1920, the site chosen being one adjoining the B.H.P. Company's Steel Works, Newcastle, N.S.W. The raw material in the form of sheet bars for the production of both Black and Galvanized sheets is obtained from the latter Company.

Rolling operations commenced with two mills in April, 1921, and the plant was gradually extended until in May, 1928, eight mills were in operation. The whole of the plant is electrically operated. The plant includes modern annealing, pickling, and galvanizing units, together with the necessary equipment for flattening and corrugating. In 1930, eight more mills were laid down, together with the other equipment necessary to increase the possible annual production of Galvanized Sheets to 80,000 tons.

Lysaght's Newcastle Works have greatly benefited by the long experience of the parent British Company—John Lysaght Limited, of Bristol and Newport—the high quality and long-standing reputation of whose sheets, both Black and Galvanized, is preserved in the Australian production.

QUALITIES AND BRANDS

LYSAGHT

AUSTRALIA

"ORB" Galvanized Corrugated

The recognised standard quality for corrugated sheets throughout Australia.

LYSAGHT

TANKMAKING AUSTRALIA

"ORB" Tankmaking (Very Heavily Coated) The highest grade of Tankmaking sheets available. Strongly recommended for use under exacting climatic conditions or where the water possesses mineral properties detrimental to the life of ordinary sheets.

"GUINEA"

AUSTRALIA

'GUINEA' Galvanized Corrugated

A good quality sheet second only to "ORB" in quality. Recommended for use where price is a consideration

LYSAGHT

'QUEEN'S HEAD' AUSTRALIA

'QUEEN'S HEAD' Galvanized Plain

The recognised standard quality for Plain Galvanized Sheets throughout Australia.

LYSAGHT

'FLEUR DE LIS'

AUSTRALIA
"FLEUR DE LIS"
Galvanized Plain

A good quality sheet, used extensively for the lighter class of sheet metal work where price is a consideration.

THE NEW "RED ORB"

Lysaght's Newcastle Works are now producing a new 26 gauge "Orb" Galvanized Corrugated Sheet specially designed for roofing and walling purposes. This new production is more rigid and less pliable than the ordinary 26 gauge "Orb" Sheet, and is therefore not suitable for curving. To distinguish this new class of sheet from the ordinary 26 gauge "Orb" (which is branded in Blue) the branding is in Red, and the new production will be known as "Red Orb." Being more rigid than the usual Galvanized Corrugated Iron, this new quality will better withstand handling and transit, and will carry heavier weights without distorting the corrugations.

It is sold at the same price as the ordinary 26 gauge "Orb," and is obtainable from the same sources of supply.

LYSAGHT
TRADE ORB MARK
AUSTRALIA
NOT FOR CURVING

(Continued on next page)

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

Manufacture

The whole of the raw material used in the manufacture of Lysaght's Australian-made sheets, both Black and Galvanized, is produced in Australia. The steel from which the sheets are rolled is received in multiple bars from the Broken Hill Pty. Co. Ltd.'s Steel Works, Newcastle. These bars are cut into lengths and heated in furnaces, then rolled into sheets (the illustration on page 2 shows this process). The sheets are next sheared to the required size, cold rolled and annealed.

Sheets intended for galvanizing are then pickled in an Automatic Pickling Machine, from which they pass direct into the Galvanizing Department Here the sheets are passed through a bath of molten Spelter, and it is on the protection of this coating of Spelter that the life of the galvanized sheet depends. Lysaght's *"ORB"* and *"QUEEN'S HEAD"* brands hold the premier position for perfection of galvanized sheets, and these brands are guaranteed by the manufacturers.

A most complete system of inspection is adopted right throughout the works; after each operation the sheets are examined, and, if defective in any way, they are rejected.

The result is a finished sheet equal to that produced in any part of the world.

Space does not permit a more detailed description of the most interesting and intricate processes, but special facilities are afforded to architects, engineers, and students, etc., to inspect the Works, and permits may be obtained on application to John Lysaght (Australia) Limited, Endeavour House, Macquarie Place, Sydney

Steel Sheet Rolling Mill.

What Type of Construction for Industrial Buildings

The modern industrial building must have elasticity. The chief consideration in constructing such a building is to house the plant so that it may yield the maximum of efficiency. The space necessary to house the present plant may be easily determined, but it is impossible to forecast whether more or less area will be needed in the future. It may be necessary to install a number of larger machines occupying more space, or, on the other hand, a device might be invented to perform the work of several large machines, and which would fill only, say, 25 per cent. of the space. In that event, a large area of space is left which becomes so much waste. To overcome this difficulty, the building material must be one that makes possible extension or re-construction on any scale, a flexible product, always capable of re-adjustment for every requirement. For this purpose, *"ORB"* galvanized corrugated sheets are ideal. Obviously, buildings constructed of this material may be extended or diminished in size as required, quickly and economically. A galvanized sheet industrial building may be said to be portable as well as permanent

Exterior View of Lysaght's Newcastle Works. A typical modern example of steel fabrication with "ORB" Galvanized Corrugated Roofing and Siding.

Life of Galvanized Sheets

The life of a galvanized sheet depends upon the uniformity of its zinc coating; the smallest ungalvanized spot weakens the whole sheet. So far as durability is concerned, the base of the galvanized sheet is immaterial; pure iron, charcoal iron or steel will all perish quickly when the coating is destroyed

"ORB" and *"QUEEN'S HEAD"* brands are the most perfect and heavily coated sheets manufactured, and will, therefore, outlast any other make

Advantages of "Orb" Galvanized Corrugated Sheets

Adaptable to many kinds of construction and types of buildings

Ease of application unskilled labour may be employed.

Fire retardent

Slow depreciation—satisfactory service

Develops maximum strength through the distinctive corrugations.

Watertight construction on any angle guaranteed by use of ample side and end laps.

(Continued on next page)

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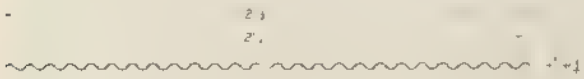
CORRUGATED GALVANIZED SHEETS

Description

The "*ORB*" standard galvanized sheets, which are so extensively used for all types of industrial and domestic structures because of their durability and resistance to corrosion, are manufactured in any gauge from 16 to 28, and in standard widths of eight 3-in. corrugations of ¾-in pitch, as shown in the diagram.

"Orb" 1in. Corrugated Sheet

The "*ORB*" standard 1-in. corrugated sheets generally of 24g., 26g., or 28g., are used for ceilings, linings, bath screens, awning panels, fences, etc., and have the following section: —



Covering Capacity

The gauge of sheets usually used for roofing and siding are 22, 24, or 26. 24-gauge "*ORB*" is recommended for general use, and 22-gauge where corrosive conditions are bad.

One ton of corrugated sheets has the following approximate covering capacity

	24 G 3 in Cor	26 G 3 in. Cor	26 G 1 in. Cor	28 G 1 in. Cor
Single Lap	1,600 sq. ft	2 200 sq. ft	2 327 sq. ft.	2 645 sq. ft.
Lap and half	1 500 "	2,000 "		
Double Lap	1,400 "	1,900 "	2,230 "	2,535 "

One packet (100) spring head nails are usually allowed to the square.

Available Sizes

The table shows the list of available sizes and gauges, and approximate number of standard 3-in corrugated sheets to a case weighing about 10 cwt.*

Length.	Gauges. 16	18	20	22	24	26	28
5 feet	33	42	53	66	83	118	132
6 feet	27	35	44	55	69	98	111
7 feet	23	30	38	47	59	84	95
8 feet	20	26	33	41	51	73	83
9 feet	18	23	29	36	45	65	74
10 feet	16	21	26	33	41	58	66
11 feet	15	19	24	30	38	54	—
12 feet	14	17	22	28	35	49	—

Weights per Sheet

Approximate weight per sheet in lbs. (based on above table to nearest ½ lb.).

Gauge	5 ft.	6 ft.	7 ft.	8 ft.	9 ft.	10 ft.	11 ft.	12 ft.
16	34	40½	48	54½	62	68	74½	81 lbs
18	26½	32	37½	43	48	53	58½	64 "
20	21	25½	29½	34	38½	43	46½	51 "
22	17	20½	24	27½	31	34	37½	40½ "
24	13½	16½	19	22	25	27½	29½	32½ "
26	9½	11½	13½	15½	17½	19½	20½	23 "
28*	8½	10	11	13½	15½	17		

*1-in corrugated sheets only

GALVANIZED PLAIN SHEETS

"Queen's Head" Sheets

Lysaght's "*QUEEN'S HEAD*" plain galvanized sheets are recognised throughout Australia as being unequalled when sheets possessing the qualities of perfect galvanizing and exceptional finish are desired. They can be used with the greatest of confidence for all classes of galvanized linings and flat roof construction where even the slightest degree of corrosion is to be avoided.

In addition to this very important use, reputable firms of sheet metal workers use nothing else but "*QUEEN'S HEAD*" sheets for the manufacture of spouting, ridging, valleys, downpipes, rainwater heads, vent ducts, sheep troughing, baths, tank tops and bottoms, etc.

"Fleur-de-lis" Sheets

These sheets are largely used for the manufacture of lighter classes of guttering, downpiping, ridging, etc., its smoothness of surface and freedom from buckling being conspicuous features.

DETAILS OF THE STANDARD 6 FT. AND 8 FT. "QUEEN'S HEAD" SHEETS

6 feet Sheets

Approximate number of 6 ft. sheets to a case of Plain Iron averaging about 10 cwt.

Gauge	Width 24in.	30in.	36in.	48in.
14	36	23	19	
16	36	29	24	17
18	47	37	31	23
20	57	45	38	28
22	74	59	49	37
24	86	69	57	43
26	120	97	80	
28	140	112	92	
30	160	130	112	

Approximate weight per sheet 6 ft. long, in lbs based on foregoing list.

Gauge	Width 24in.	30in.	36in.	48in.
14	37	48½	58	—
16	31	38½	46½	64
18	24	30½	36	48
20	19½	25	29½	40
22	15	19	23	30
24	13	16½	19½	26
26	9½	11½	14	—
28	8	10	12½	—
30	7	8½	10	—

8 feet Sheets

Approximate number of 8 ft. sheets to a case of Plain Iron averaging about 10 cwt.

Gauge	Width 24in.	30in.	36in.	48in.
16	26	21	17	13
18	35	28	23	14
20	43	34	28	21
22	55	44	37	28
24	65	52	43	32
26	91	73	61	—
28	103	82	68	—
30	120	97	81	—

Approximate weight per sheet 8 ft long, in lbs., based on foregoing list.

Gauge	Width 24in.	30in.	36in.	48in.
16	41	52	62½	82
18	32	40	48	64
20	26	33	39	53
22	20	25	31½	40
24	17	21½	26	34½
26	12	15	19	—
28	11	13	16	—
30	9½	12	13½	—

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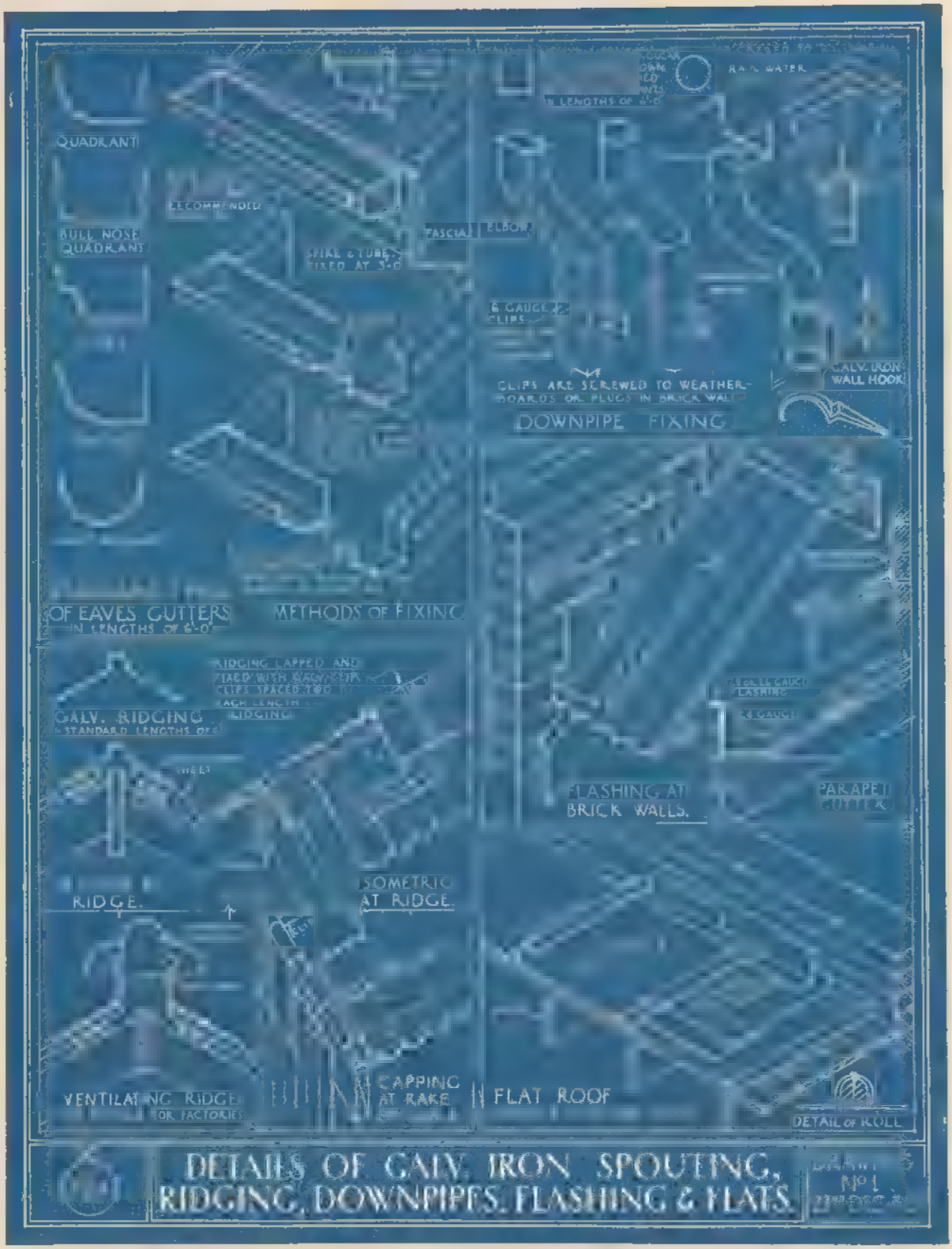

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GALVANIZED SHEET METAL FITTINGS

Spouting (or Eaves Gutters)

The most usual types of spouting are illustrated on Drawing No. 1, the stock sizes being 3, 3½, 4, 4½, 5, 6 ins wide, in 6 ft. and 8 ft. lengths. Nothing less than 26-gauge sheets should be used, and for first-class work, 24-gauge *"QUEEN'S HEAD"* is recommended, particularly when exposed to seaside atmospheres.

Fixing is provided by means of galvanized spikes and tubes or 1½-in. wide galvanized brackets (not less than 16-gauge) spaced at intervals of approximately 3 ft. These brackets are made in two types; one is fitted with a light strap, which clips over the head of the spouting, as shown in Drawing No. 1, and the other is a plain bracket, which secures the spouting at the front, underneath the bead, with $\frac{7}{32}$ x ½ in. galvanized bolts

Spouting should be set at a slight fall (say ⅛ in. in 10 ft.) towards downpipes, and all joints should be lapped in the direction of the water flow, double riveted, and soldered

Ridging and Hips

Galvanized ridges and hips formed from *"QUEEN'S HEAD"* sheets are available in stock sizes of 12, 14, 15, 16, 18, 20, 24 ins. (these measurements represent width of sheet from which ridging is formed), in 6 ft. and 8 ft. lengths of 26 and 24 gauge. The architect is recommended to specify 24 gauge.

Joints are either over-lapped at least 6 in. and secured in connection with roofing sheets, or lapped 2 or 3 in. and secured with 1½-in. wide 16-gauge clips, which are fixed to battens with spring-headed roofing nails or galvanized screws and washers.

"QUEEN'S HEAD" sheets are greatly used by sheet-metal workers in the formation of ventilating ridges suitable for all types of public and industrial buildings. A type suitable for the latter building is shown, the ventilating area varying according to the requirements of the individual job. Ventilating ridges are in 6 ft. and 8 ft. lengths, and when placed in position the ends are over-lapped, or butted and strapped with 16 gauge saddle clips, which follow the contour of the ridging and are secured in turn to the battens as above.

Gutter Lining

Lead as a gutter-lining material is most unsuitable in Australia, where the extremes of temperature subject it to excessive expansion and contraction, resulting in "creeping" and cracking. *"QUEEN'S HEAD"* galvanized sheets of 22 or 24 gauge, not being subject to these defects, are ideally suited for all types of parapet, box and valley gutters.

The sheets should be carefully bent to shape, double-riveted and soldered at laps, and left as free as possible, avoiding the use of nails. All laps must be made in the direction of the water flow.

The recommended fall for box and parapet guttering is 1½ in. to every 12 ft.

Down Pipes

Circular downpipes made from *"QUEEN'S HEAD"* sheets are stocked in diameters of 1½, 2, 2½, 3, 3½, and 4 ins , and rectangular sections in sizes of 3 x 2 in., 4 x 3 in., 4 x 4 in., and 6 x 4 in. They are of 24 and 26 gauge and in 6 ft. and 8 ft. lengths, with seamed joints

Downpipes are connected to spouting with tapered galvanized thimbles fitted to the bottom of spouting. Thimbles are slightly flanged at their tops in order to make a neat soldered connection at this point.

Offsets and elbows to complete the various lengths of downpiping and to set around projections are available. The usual connection to eaves gutter is made by straight elbows, special swan-neck bends are used in better-class work.

Downpipes are secured to walls with 16-gauge galvanized straps, which are screwed directly to weather-boards or plugs in brick walls. An alternative method for securing pipes to brick walls is in the use of galvanized wrought iron wall hooks, which are driven into plugs inserted in the joints of brickwork.

Flashing

For general flashing purposes, *"QUEEN'S HEAD"* galvanized sheets are highly satisfactory, and, according to the nature of the job, 24, 26, or 28 gauges may be used.

The drawing shows the flashing at the intersection of a roof and brick wall. The galvanized roofing sheets should be bent up against the wall for at least a height of 2 in., and then over-flashed with 24, 26, or 28 gauge stepped cover pieces built in to the brickwork joints about 1½ in., and secured with lead wedges. All flashings should have a vertical height of at least 6 in.

Galvanized Flats

In the formation of flats it is advisable to use the smaller width sheets, and to place them in position as free as possible, in order to accommodate any slight expansion or contraction.

The detail of Drawing No. 1 shows the construction of a typical flat formed with 6 ft. x 24 in., 24-gauge *"QUEEN'S HEAD"* sheets. The T. & G decking is constructed with a slight fall, and wood rolls spaced as shown. The sheets are placed in position, turned up against the wall and at sides of rolls, and are lapped, double-riveted, and soldered at joints

The rolls and upstanding edges of sheets are covered with galvanized capping, which is bent over so as to clinch sheets in position, and is then secured at top with galvanized screws and washers.

Proportioning Gutters and Downpipes to the Roof Surface

The size of gutters and downpipes and their distance apart for roofs of industrial buildings with a ¼ pitch may be determined from the following table —

One-half roof-span in feet	10	20	30	40	50
Size of gutter in inches	5	5	6	6	7
Diameter of downpipe in ins.	3	3	4	4	5
Spacing of downpipe in feet	50	50	50	50	40

Another method used is to allow 1 square inch of downpipe area for each 75 square ft. of roof surface drained.

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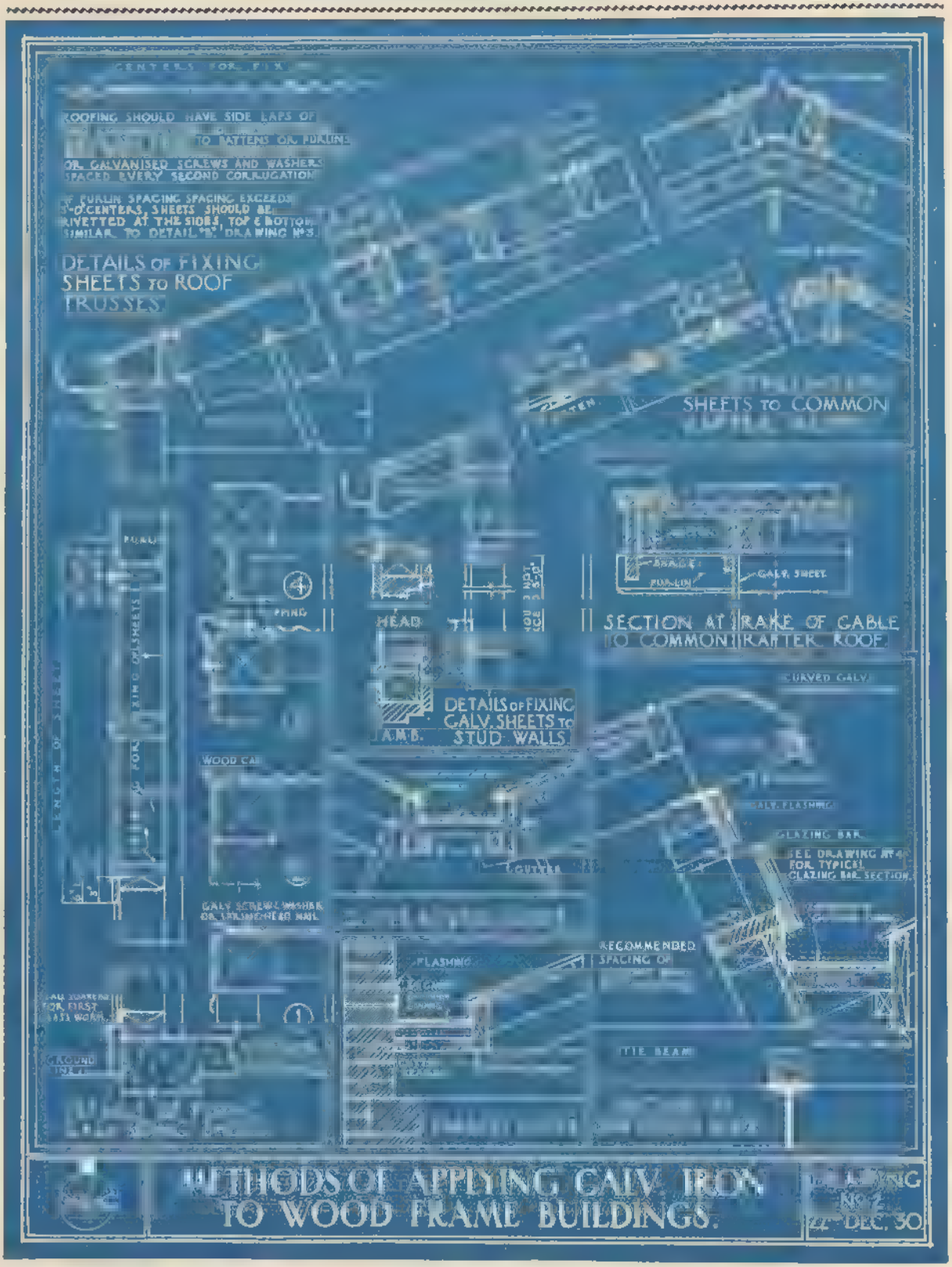

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CORRUGATED GALVANIZED SHEETS

Application to Wood Frame Buildings

Roofing

"ORB" standard corrugated sheets are applied directly to battens or purlins, and fixed by means of galvanized screws and washers or special spring-headed roofing nails pierced through the top of each alternate corrugation, the size of nails or screws varying from 2 to 3 in. Sheets should be laid with a side lap of 2 corrugations and end lap of 9 ins

Each sheet should be secured, as described, at the top, bottom, and across centre, the spacing of purlins or battens not exceeding 3 ft. centres if sheets are to be left unriveted. If purlins exceed 3 ft. centres, it is recommended that sheet be riveted similar to those applied to steel frame structures as described on page 8, and illustrated on Drawing No. 3. The recom mended spacing of wood purlins is 2 ft. 6 in. to 3 ft centres

Wall Siding

Corrugated sheets, as wall siding, are applied in a similar manner to the roofing sheets. Sheets may be lapped 1½ or 2 corrugations at the side, but not less than 6 in. at the ends. The side purlins of wall framing, or nogging, of ordinary stud walls should not exceed 3 ft. centres when designed according to best practice

Corners of buildings may be finished by any of the methods shown on the drawing. The finish at No 3 is to be preferred, as the galvanized capping provides a complete watertight job.

Ridging, Flashing, Gutter Linings, etc.

Examples of this work are shown on Drawing No. 2. Typical details of finish at eaves and gables are also given.

Details of the application of galvanized sheets to a saw-tooth roof are shown. The curving of the sheets at the top of the saw-tooth is formed in the sheet-metal shop in accordance with architect's details The finish at the head provides excellent ventilation, bird-wire should always be fixed as indicated, to prevent the ingress of birds.

APPLICATION TO STEEL FRAME BUILDINGS

Roofing and Siding

The sheets should be applied with similar side and end laps as recommended for wood-frame buildings They may be secured to wood purlins used in conjunction with steel framing, in which case fixing would be provided as before. If framing is of all-steel construction, the sheets are usually secured to steel purlins with hook bolts.

Hook bolts, as the name suggests, are galvanized bolts threaded one end and hooked at the other. Holes are punched in the sheet at desired points of fixing, and the bolts passed through them and hooked over the purlin, and the sheets firmly drawn down and tightened by the nut at the threaded end. A lead and a galvanized washer are placed between the nut and the galvanized sheet. The lead washer is placed next to the sheet, and the galvanized washer fits it so as to form a protection from the pressure of the nut.

The length of the bolt varies in accordance with the size of purlins; the diameter is generally ¼ in.

Application of Sheet Metal Fittings

The eaves treatment shown on the drawing provides a substantial and lasting finish, but where economy is desired, an effective fixing is gained by simply supporting the spouting by means of galvanized brackets (similar to those described on page 4), which are in turn attached to the underside of corrugated roofing sheets and secured with two sheet bolts spaced about 3 in. apart. This fixing is similar to that shown at the right-hand lower corner of the drawing, where the method is used in connection with the eaves formed at a brick wall.

Sheet bolts (galvanized) are dome-headed, and fitted with galvanized nut and washer. The usual sizes are ¼ in. x $\frac{7}{32}$ in., ⅜ in. x ¼ in., ⅜ in. x $\frac{5}{32}$ in. When used as above the head is at the underside of sheet, and the nut and washer finishes on top of the corrugation.

Other uses of these bolts are made when attaching downpipe clips to galvanized siding sheets, and at ridging clips where no wood purlins or battens are provided for fixing. Detail "A" shows their application for corner finishing.

Internal Gutters

Drawing No. 3 shows a typical method of installing a galvanized sheet gutter between two roofs. The gutter lining should not be less than 24 gauge—22 or heavier is recommended—with end laps double riveted and soldered. The lining is supported by 1½ x ⅜ in. galvanized hoop iron brackets, spaced at 3 ft. centres, and bent over steel purlins or securely screwed to wood purlins as shown.

Purlin Spacing

Spacing of purlins should not exceed 4 ft. centres, excepting when it is the intention to rivet together the galvanized sheets at the sides, top and bottom, as recommended at Detail "B." Care should be exercised by riveters so as to avoid punching holes too large or breaking the galvanized coating. It is of great importance that rivets be placed at the top of the corrugations at the points of fixing. The size rivets generally used for such riveting is ⅜ x $\frac{5}{16}$ in., or ½ x ¼ in.

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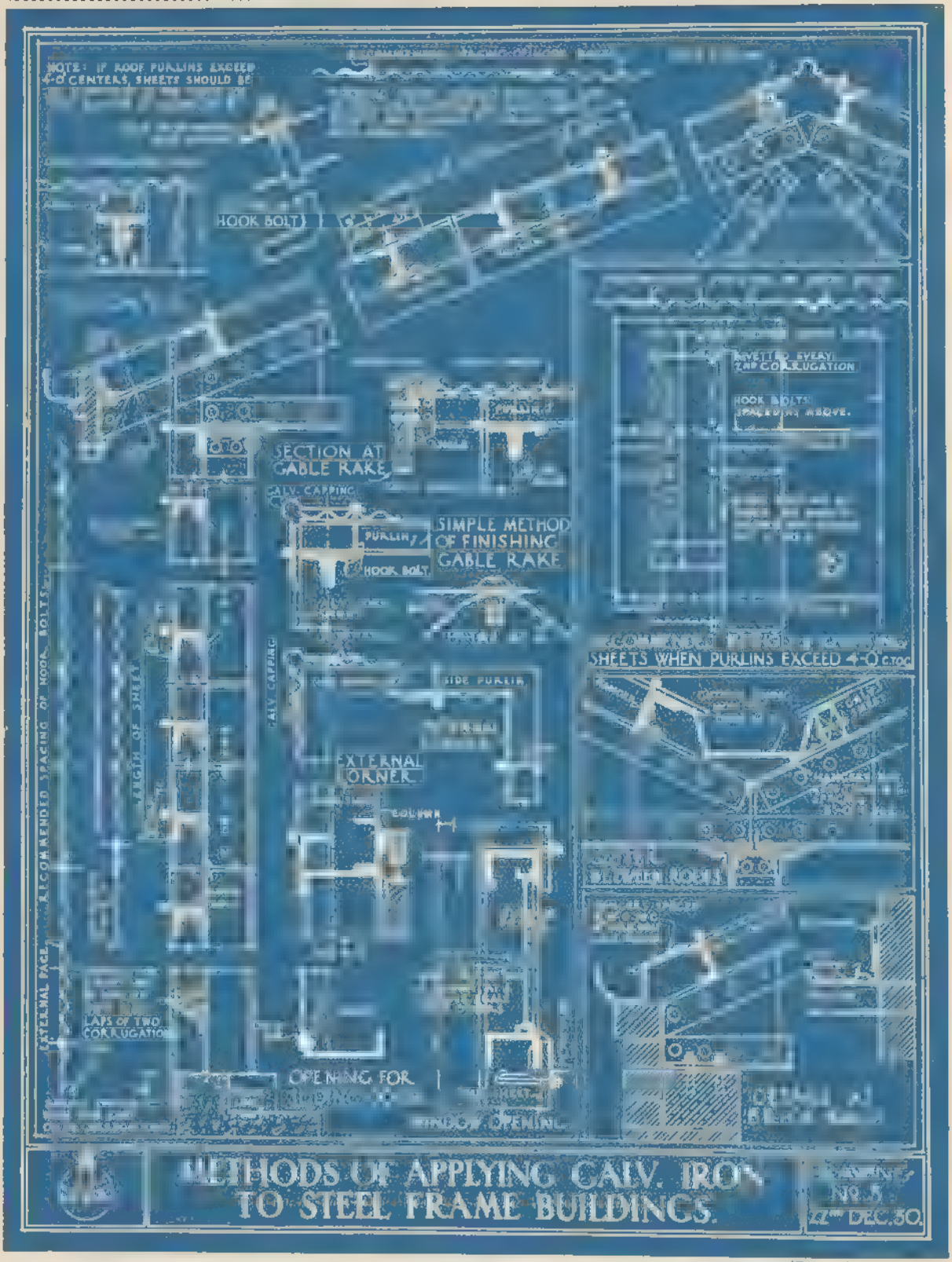

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ARCHITECT'S SPECIFICATION

MATERIALS

GENERAL

All galvanized materials noted in this specification shall be as manufactured by Lysaght's Newcastle Works Ltd. Galvanized sheets shall be of specified gauge with manufacturer's brand indicated on each sheet. All hangers, screws, nails, etc., shall be galvanized.

GALVANIZED CORRUGATED SHEETS

Shall be standard 3 in. corrugated Australian "ORB"

GALVANIZED LINING SHEETS

All specified internal galvanized lining sheets shall be standard 1 in. corrugated Australian "ORB" brand.

SHEET METAL

All sheet metal used in the formation of flat roofs and in the manufacture of spouting, downpipes, ridging, gutter linings, flashing skylights and ventilators shall be of (a) Australian "QUEEN'S HEAD," or (b) Australian "FLEUR-DE-LIS" brand, galvanized tinned special flat sheets

SOLDER

Where specified to be used, solder shall be of best grade and consist of even parts of tin and lead.

WORKMANSHIP

GENERAL

The application of corrugated sheets and sheet metal fittings shall be in strict accordance with the following specifications. When details are provided, construction shall be as indicated on drawings

Care shall be exercised to avoid breaking galvanized coating when forming and applying sheets. The same care shall be necessary when securing sheets with screws, bolts, nails and rivets. Sufficient solder shall be used at laps to provide complete waterproof joints.

SPOUTING (OR EAVES GUTTERS)

Spouting shall be in. 24 gauge . .. .. type in 6 ft. or 8 ft. lengths.

Spouting shall be (a) secured to rafters with 16 gauge galvanized brackets screwed with a pair of screws to each alternate rafter, or at intervals of approximately 3 ft.; (b) secured to fascia boards with galvanized spike and distance tubes spaced on 3 ft. centres; (c) fastened to corrugated roofing sheets with 16-gauge brackets secured to sheets at intervals of 3 ft. with a pair of .... in. galvanized bolts, nuts and washers at each point of fixing

Spouting sections shall be double riveted and soldered at laps. Cut holes in spouting for receiving thimble connection of downpipes and properly solder at these junctions.

DOWNPIPES

Downpipes shall be (a) 24 gauge in. diameter, (b) 24 gauge x in. rectangular sections in lengths of 6 ft. or 8 ft.

Downpipes shall be secured (a) to weatherboards with 16-gauge galvanized straps screwed to wall; (b) to brickwork joints with galvanized wrought iron wall hooks (c) to corrugated wall siding sheets with 14 gauge galvanized straps bolted to sheets with a pair of ...in. galvanized bolts and washers. Spacing of same to be two to every length of pipe.

Downpipes shall be connected to thimble connections with swan necks (or straight elbows) and at the foot to stone pipe drains with rounded shoe pieces through cemented joints.

GUTTER LININGS

Linings of parapet, box and chimney gutters shall consist of (a) 22 gauge, (b) 24 gauge galvanized sheets, carefully bent to shape and laid on (a) wood line gutters constructed to detail, (b) in -¾ x ⅛ in. galvanized hoop iron hangers spaced at 3 ft. centres and bolted to corrugated roofing sheets with a pair of .....in. galvanized bolts (provided with galvanized washers) at each point of fixing. Lining shall extend up pitch of roof for a minimum distance of 8 in or to a point at least 5 vertical inches above front edge of gutter. All laps at ends of sheets shall be 4 in. and doubled riveted and soldered Provide a continuous fall of 1½ in. in every 12 ft. towards drainage outlets.

VALLEY GUTTERS

Valley Gutters shall consist of (a) 22 gauge; (b) 24 gauge .... .in. wide galvanized sheets in 6 ft. or 8 ft. lengths, carefully bent to shape and laid with 4 in. end laps double riveted and soldered.

FLASHINGS

All flashings shall consist of (a) 26 gauge, (b) 28 gauge galvanized sheets.

Flashings at intersections of brick walls and corrugated roofing sheets shall be properly (a) cut and stepped, (b) aproned two courses above intersection and extended at least 4 in. out on to roofing, and secured in brickwork joints with lead wedges and afterwards pointed up in cement.

Note. Specify flashings at parapet gutters of brick walls similar to the above apron flashing (b) omitting the portion specifying flashing to be carried out on roof.

The heads and sills of door and window openings in corrugated sheet walls, and the sills of dormers in galvanized roofs should be flashed with gauge metal previously specified.

RIDGING

Ridging shall be (a) 22 gauge; (b) 24 gauge sheet metal formed from ... ..in. wide sheets of 6 ft. or 8 ft. lengths. Ridging shall be applied where shown on drawings, lapped (a) at least 6 in. at end joints and securely fixed in position in conjunction with roofing sheets; (b) at end joints and secured with 16-gauge clips spaced two to each length of ridging, and fixed to battens or purlins with (a) special spring-headed roofing nails; (b) galvanized screws and washers.

VENTILATING RIDGES

Provide No. ... .6 ft. or 8 ft. lengths of .. ...brand . ....in. ventilating ridges. Ridges shall be laid with (a) 6 in. over-lapped joints; (b) butt joints covered with 16-gauge saddle clips; secured to woodwork with (a) special spring-headed roofing nails; (b) galvanized screws and washers.

HIPS

Specify similar to "Ridging."

FLAT ROOF

All wood decking shall be laid solid and nails driven flush and surfaces swept clean as a preparation for receiving sheet metal. Wood rolls shall then be nailed to decking, with intervals of 21 in. between their sides. Cover all panels so formed with 24 gauge 24 in. wide galvanized flat sheets with edges carefully bent up 1½ in. at sides of rolls and 3 in. at intersection of deck and wall. All laps at ends of sheets shall be 4 in. and double riveted and soldered

Cover rolls and upstanding edges of sheets with 24 gauge galvanized capping bent over to clinch sheets at sides and secured on top with galvanized screws and washers spaced not more than 2 ft. centres.

Flash at intersection of walls and roof as specified under "Flashing."

CORRUGATED ROOFING SHEETS

All pitched roofs shall be covered with . ft. 24 gauge corrugated galvanized sheets, and applied with a side lap of two full corrugations and an end lap of 9 in. Sheets shall span at least two purlin (or batten) spacings and be secured to (a) all purlins (or battens) with spring-headed roofing nails (or galvanized screws and washers) pierced through the top of every second corrugation; (b) steel purlins with in. galvanized hook bolts provided with galvanized and lead washers, three to each sheet or spaced as indicated on details

The gable rake shall be finished by applying (a) wood barge board and cap as specified in "Carpenter"; (b) 24 gauge . in. capping secured with 16 gauge clips spaced at approximately 3 ft. centres and fixed (a) to wood framing with galvanized screws and washers; (b) with . ....in. galvanized bolts and washers to the roofing and siding sheets forming the gable rake.

Curved sheets at the head of sawtooth roof shall be curved to a .. in. rise and provided with .... x .... in. batten secured to sheets with (a) spring-headed nails, (b) galvanized screws and washers. This batten shall provide fixing for the outer edge of galvanized bird wire secured as shown on detail drawing.

For Remainder of Architect's Specifications—see Page 12

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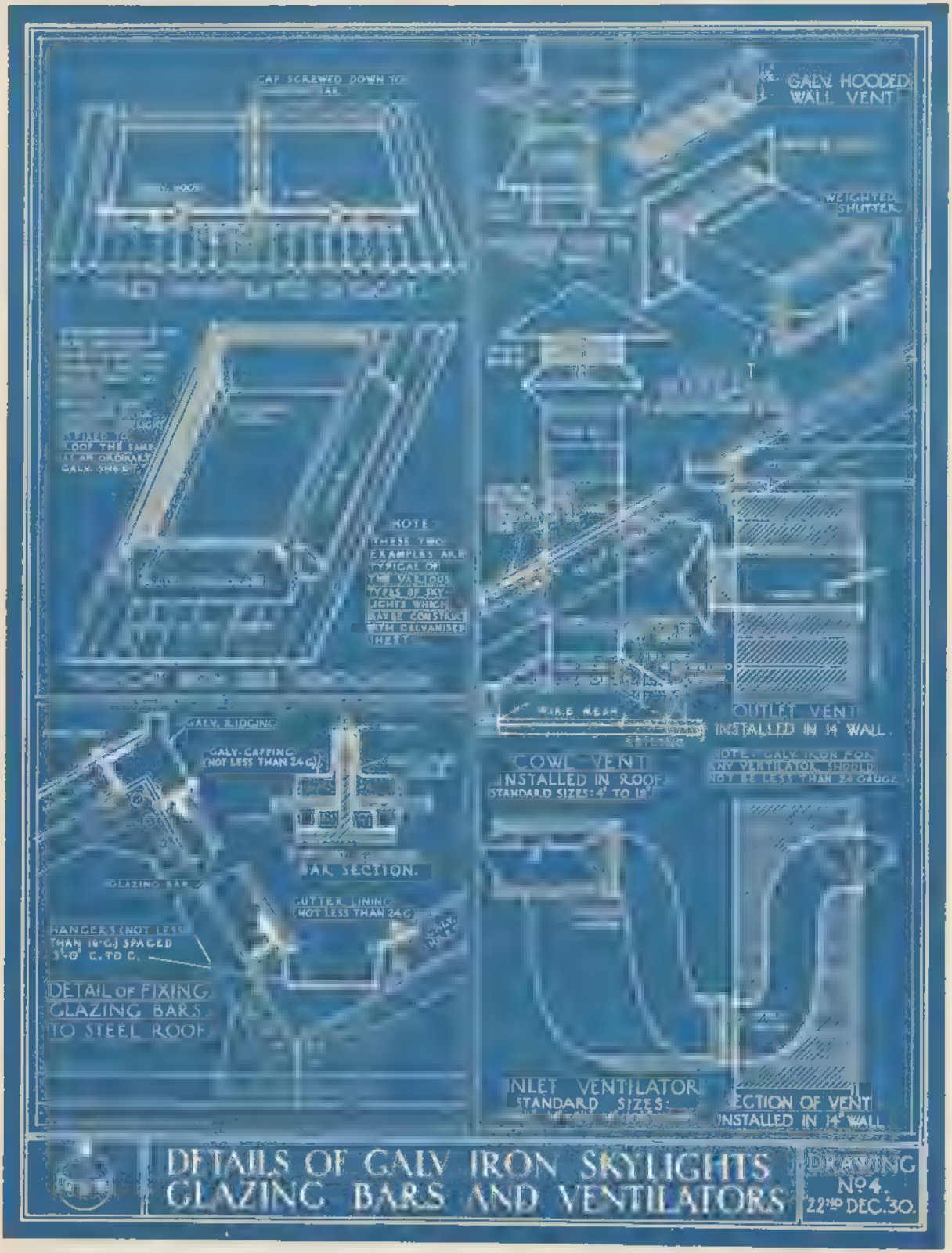

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SKYLIGHTS, GLAZING BARS AND VENTILATORS

General

The formation of skylights, ventilators and glazing bars is usually entrusted to sheet-metal specialists, whose patented systems, in the majority of cases, includes the exclusive use of "*QUEEN'S HEAD*" sheets as the galvanized sheet metal. This can be readily appreciated when the great strength and rigidity which these sheets impart to the articles are considered

Skylights

With few exceptions, galvanized metal skylights usually consist of four different types, viz :—

(i) Fixed unventilated type.

(ii) Fixed ventilated type.

(iii) Unventilated type fitted with lever and pulley for opening.

(iv) Ventilated type fitted with lever and pulley for opening.

All the above skylights are obtainable in varying measurements, according to the manufacturer's stock sizes.

Typical examples of fixed unventilated and ventilated skylights are shown on Drawing No. 4. The fixed unventilated type, in this case, is provided with a centre glazing bar, which is a necessity for all skylights of extreme widths. The glass is inserted in the frame of the skylight, and secured in position with galvanized clips at the bottom, being supported at the centre by means of the glazing bar In better-class skylights, this centre bar is reinforced with a steel section

Ventilation is provided at the sides with perforated zinc or wire gauze, which is protected from the weather by means of galvanized hoods, thus making the ingress of rain impossible

Opening skylights are similar in construction to the other types, but the glass panes are so framed that they may be operated from below by means of cords, pulleys and levers.

Glazing Bars

The glazing of saw-tooth roofs and other large areas is most effectively carried out by the use of patented glazing bars, which generally consist of special steel sections complete with condensation channels and glazing capping The applications of glazing bars to saw-tooth roofs are shown on Drawings Nos. 2 and 4, the latter drawing showing the cross section of a typical bar.

The outstanding features of such bars are:—Provision for draining away condensed moisture; maximum light area freedom for expansion and contraction of glass, and light construction.

In most cases, the bars are delivered already drilled, ready for bolting or screwing to purlins. The recommended spacing of bars is 2 ft. centres.

Ventilators

The usual types of ventilators are indicated on Drawing No. 4. The sheet metal used in the construction of any of these vents should not be less than 24-gauge. The first three types are suitable for use in public or semi public buildings.

Inlet Ventilators.—These vents, as shown in drawing, are provided with hinged hoppers, which regulate incoming draughts. The usual position in walls is about 6 ft. 6 in to 7 ft. from floor line to lower edge of internal face of ventilator. Sizes are as shown on drawings, an additional size, 12 x 5 in., is available for stud-wall installations.

Outlet Ventilators—Are provided with weighted shutter, external baffle plate and bird wire, and are placed near the ceilings. In addition to the given sizes, there is also made a 12 x 5 in. size, suitable for installing in stud walls.

Cowl Vents—Are suitable for installing at ceiling levels. Standard sizes, together with a typical installation, are shown.

Hooded Wall Vents.—These are largely used because of their low cost and simplicity of installing in stud walls of domestic buildings.

MISCELLANEOUS DATA

Painting of Galvanized Sheets

If possible, the painting of galvanized sheets should be delayed six or nine months after they are fixed. But if this is impossible, the sheets may be washed with acetic acid and then thoroughly **washed again with water and allowed to dry before the paint is applied.**

There are also available various priming coats which are prepared ready for application to the surfaces of new galvanized sheets.

Where exposed to sea air or acid vapours, the sheets should be painted with oxide of zinc, which is more efficient than white lead

In all cases be sure that sheets are thoroughly dry before painting, as this is the usual cause for paint not adhering to the surface.

Side and end laps should always be painted before fixing.

Solder

Ordinary solder consisting of even parts of tin and lead, and fluxes of resin or spirits of salts is generally used for soldering galvanized sheets.

The connecting parts of sheets or fittings should be in tight contact and thoroughly cleaned before flux is applied

Ventilating Ducts

"*QUEEN'S HEAD*" galvanized sheets are recommended for use in the construction of ventilating ducts—their uniform quality, retention of shape and rigidity when bent into circular sections and resistance to the corrosive action of gases make them highly suitable for all classes of conduit and airduct work

The following sizes and gauges are recommended for circular and rectangular sections:

B.G.	26	24	22	20	18	16
Round — diameter (inches)	15	30	42	54	72	above
Rectangular—longest side (inches) .	18	26	40	72	84	above

INSTALLATION NOTES

All ducts having a cross-sectional area of six square feet or larger, should be stiffened with internal corner angles riveted to duct.

Make all ducts with slip joints in the direction of the air flow.

Ducts should be essentially airtight—made up with standing seams.

All duct work should be supported in a substantial manner. Small ducts should be supported with heavy strap-iron hangers; large-size ducts by angles with vertical rod hangers.

(Continued on next page)

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ARCHITECT'S SPECIFICATION
(Continued from Page 9)

WALL SIDING SHEETS

Wall framing shall be covered with ..... ft. 24 gauge corrugated sheets applied with side laps of (a) 1½ corrugations, (b) 2 corrugations, and an end lap of 6 in.

Note.—Complete paragraph specifying sheets to be secured to side purlins or nogging with same methods of fixing as provided for roofing sheets.

EAVES FINISH

The sheets shall be finished at (a) the eaves; (b) the gable, by cutting them parallel to the rake and by (a) applying a wood fascia as specified in "Carpenter"; (b) bringing them in to firm contact with the underside of projecting roofing sheets.

CORNER FINISH

The corners of galvanized sheet walls shall be finished with (a) 22 gauge (b) 24 gauge .... in. capping secured with 16 gauge clips spaced at 3 ft. centres and fixed (a) with galvanized screws and washers to corner posts; (b) to siding sheets with ..... in. galvanized bolts and washers.

INTERNAL LININGS

Note.—First specify the areas to be lined, such as the soffits of stairs partition linings, etc.

The foregoing linings shall consist of (a) 26 gauge, (b) 28 gauge .... ft. standard 1 in. corrugated sheets applied with a lap of ... corrugations, and secured to wood framing with roofing nails.

SKYLIGHTS

Provide and install where directed No. brand skylights

Skylights shall be 24 gauge (a) fixed ventilated type, (b) fixed unventilated type; (c) ventilated type fitted with lever and pulley for opening, (d) unventilated type fitted with lever and pulley for opening

Skylights shall be complete with condensation gutters, capping and clips; all centre bars over 4 ft. in length shall be of special steel glazing bar sections.

Glazing shall be as specified in "Glazier."

GLAZING BARS

Glazing bars shall be of an approved brand with sections designed to prevent the ingress of water from the outside, and constructed with condensation channels on the inside. Galvanized metal shall be of 24 gauge and shall be reinforced with mild steel sections when spans exceed 6 ft.

Bars shall be spaced at ... ft. centres, securely (a) screwed, (b) bolted to roof framing.

Glazing shall be as specified in "Glazier."

VENTILATORS

Provide and install where directed the following ventilators, which shall be of ... . (state brand or make), and constructed to the requirements of the *

Note.—*The local body who has jurisdiction over the work.

(a) Nos. .... ., ... x ... in., 24 gauge sheet metal inlet ventilators, the full depth of walls and fitted complete with hinged hopper and external wire mesh. Ventilators shall be carefully installed in walls, having a height of ... ft. ... . in. from floor line to the lower edge of internal face of hopper.

(b) Nos. . ... , . . x . . . in , 24 gauge sheet metal outlet ventilators, the full depth of walls and fitted complete with weighted shutter, external baffle plate and bird wire.

(c) Nos. . .. ., ... x ... in. diameter, 24 gauge sheet metal cowl vents fitted complete with exhaust cowls, tubing and bellmouths, with the latter properly screwed to supporting framing. Corrugated sheets shall be cut to permit the vents passing through roof; and flashing at this juncture shall consist of 4 lb. milled lead dressed over roofing corrugations and carried upon the tubing.

TABLES

TRANSVERSE STRENGTH OF CORRUGATED SHEETS.

Let W = breaking weight in tons (distributed)
L = unsupported length of sheet in inches
t = thickness of sheet in inches
b = covering width of sheet in inches
d = depth of corrugations in inches

then $W = \frac{44.6 \quad t\,b\,d}{L}$

Allowing a factor of safety of 5, then $\frac{W}{5}$ = safe uniformly distributed load in tons.

SAFE UNIFORM LOAD IN POUNDS ON OREGON PURLINS—ONE INCH THICK.

(Fibre stress—1,200 lbs. per sq. in.)

Span in Feet	Depth of Purlins in Inches						
	4	5	6	7	8	9	10
8	270	425					
10	210	335	480	650	850	1080	
12	180	280	400	550	720	900	1110
14		240	345	470	610	770	955
16		210	300	410	535	680	835
18				360	470	600	740

EXAMPLE—

Span of purlins (i.e., distance of trusses c. to c.) = 14 feet
Spacing of purlins c. to c. = 3 feet.

Load = 30 lbs per sq. ft. of roof area (includes 20 lbs. for live load and 10 lbs. for weight of purlins and roofing iron.
Total load on purlin = 30 x 3 x 14 = 1,260 lbs
Select a depth of purlin, say 6 in
Referring to table above for span, 14 feet, and depth of purlin, 6 inches, it will be found that 350 lbs. is the safe uniform load for a beam 1 inch thick; then 1,260 divided by 350 = 3.6 inches, use a 4 inch thick purlin.

DEFINITION OF THE BIRMINGHAM SHEET GAUGE i.e. (B.G.).

Approximate Inch	Gauge	Decimal of an Inch	Approximate Inch	Gauge	Decimal of an Inch
1/8th	10	125	1/28th	20	039
3/32nd	12	.099	1/32nd	22	031
5/64th	14	078	1/40th	24	025
1/16th	16	062	1/50th	26	020
1/20th	18	050	1/64th	28	016

Tank Sizes

CIRCULAR—CORRUGATED

Diameter		Height of Tank			
		4 ft.	5 ft	6 ft	8 ft.
'	in	gal.	gal	gal	gal
3	3	200	250	300	400
3	6	240	300	360	480
3	9	280	350	420	560
4	0	310	390	470	620
4	4	—		540	720
4	6			590	787
5	0			720	960
6	0			1,050	1,400

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LUXFER	BROOKS, ROBINSON PTY. LTD. ELIZABETH STREET, MELBOURNE WORKS: MAFFRA STREET, SOUTH MELBOURNE *Telephone M 3131 (5 lines)*	12 j S.A.A. File No.

[For Other Products, See Index]

THE "LUXFER" SYSTEM OF ROOF GLAZING

Description

The "Luxfer" patented system is one of the original forms of puttyless roof glazing. Many years of practical experience with roof glazing under all sorts of weather conditions has resulted in the production of glazing bar units, having the qualities of strength, simplicity, endurance and adaptability to all types of roof construction

The "Luxfer" glazing bar units are available in two sizes—No. 2 and No. 3 sections for spans (without the use of purlins) up to 6 and 10 feet respectively. Both sections with details of application are shown on the two following pages—a study of which will show the simplicity of the assembled units. In both cases the unit consists of a specially rolled and galvanized section acting as a combined condensation gutter and supporting bar for the glass, which is secured by a rolled copper cap fixed down with bronze bolts and nuts. A strip of asbestos is placed between the cap and glass to ensure a tight connection and prevent any great movement of the glass. The combined supporting bar and condensation gutter is of special interest, as it overcomes the inherent defects of built-up sheet-metal condensation gutters which are characteristic of some glazing bars.

ADAPTIBILITY

All forms of roofs, including domical and spherical shapes have been successfully glazed with the "Luxfer" patented system of roof glazing. The accompanying drawings, and the specifications prepared for the architect's use, indicate the simplicity of application. Drawing No. 1 shows the glazing to a steel saw-tooth roof, and Drawing No. 2 illustrates the simple and well-constructed features of the "Luxfer" system of skylight construction. Of particular interest in this construction is the manner in which the skylights are made completely dust-proof.

FEATURES

A brief summary of the general features of the "Luxfer" glazing bar unit is as follows:—

1. **Permanence.**—With the exception of the metal glass stop at the lower end of the bar, only the glass and copper capping are exposed to the weather. "Luxfer" glazing is positively watertight and should therefore last as long as the building

2. **Freedom for expansion and contraction of glass.**—The glass is held in place by the copper capping without the use of putty. It is tight, yet free to expand and contract, thus eliminating glass breakage.

3. **Condensation Gutters.** These are so designed that condensed moisture is rapidly conducted to the exterior. There is also formed between the glass bearing and stem of the section a drip gutter which catches any possible leakage.

4. **Ease of Glass Replacement.**—By unscrewing the nuts of the bronze bolts, the capping can be removed easily for necessary glass replacements caused by accidents.

5. **Other Advantages.**—Admittance of maximum daylight; formation of dust-proof skylights, and ease of erection.

SERVICE AND ERECTION

For many years, Brooks, Robinson Pty Ltd. have been engaged in solving intricate roof glazing problems. Our engineering staff is at all times ready to co-operate with you by means of a personal call or by preparation of detailed drawings, without obligation on your part.

No matter how good a roof-glazing system may be, if it is not properly assembled and applied there is always the possibility of leakage. This makes everybody concerned dissatisfied with the work; so to ensure proper erection, we maintain a skilled erection division, who can be sent to any part of the Commonwealth.

ARCHITECT'S SPECIFICATION

SAW-TOOTH GLAZING.

Note.—Work by others—Unless otherwise specified, all steel or wood roof framing, gutters, ridgings and flashings shall be provided for in another portion of the architect's specification.

Where shown on drawings, saw-tooth glazings shall be of the "Luxfer" Patented System of Roof Glazing provided and fixed complete by Brooks, Robinson Pty. Ltd., who shall make all necessary arrangements with the general contractor for his co-operation in this work.

The construction shall be as follows:—

(1) Glazing bar sections shall be "Luxfer" (a) No. 3, (b) No. 2 galvanized steel sections properly (a) countersunk bolted to steel roof framing, (b) screwed to wood framing

(2) The glazing shall consist of 24 in. wide 1 in. wired glass, which shall be secured by.... gauge copper capping fixed down to the steel sections with bronze headless bolts and nuts. A strip of asbestos cord shall be placed, parallel with the run of glazing bars, between all glazing capping and glass.

SKYLIGHT CONSTRUCTION.

Note.—Work by others—Unless otherwise specified, all wood or concrete curbs shall be provided by others.

Skylight construction shall consist of the "Luxfer" patent Improved System of Roof Glazing provided and fixed complete by Brooks, Robinson Pty. Ltd., who will be required to submit detailed drawings for the approval of the architect.

The construction shall be as follows.—

HIPPED SKYLIGHTS.

(3) Hips and ridges shall consist of 2 in. mild steel star sections framed and erected with all proper connections.

(4) Glazing bar section shall be "Luxfer" (a) No. 3, (b) No. 2, galvanized steel sections, countersunk bolted at the ridge and hips to the flanges of star section, and secured at the (a) concrete curb by countersunk riveting to a 2 in. x ⅜ in. steel plate, which in turn shall be fixed to the concrete with rag bolts (or approved expansion fittings), (b) wood curb with. . ....inch screws.

(5) Use paragraph 2.

(6) The skylights shall be rendered dust-proof by ⅜ in. x ⅜ in. dust strips (grooved and fitted with asbestos cord) applied to the curb. These strips shall be supported by metal clips secured to the curb and flanges by the various bolts, screws or rivets employed in the fixing of glazing bars.

(7) Ridging and hipping shall consist of (a) 24-gauge galvanized iron, (b).....gauge copper, (c) 4 lb. milled lead dressed over wood rolls.

(8) Flashing at curb and where else necessary shall consist of 4 lb. milled lead.

GABLE-END SKYLIGHTS.

Ridge shall be a 2 in. mild steel star section with gable consisting of 1½ in. mild steel angle framing.

Note.—With the exception of references to hipping, paragraphs 4, 5, 6, 7, and 8 can be repeated. Paragraph 5 should be enlarged as follows —

Gable end glazing shall consist of similar glass and shall be (a) securely beaded into framing with... .. . metal beads, (b) carefully set, embedded and back puttied in mastic putty.

Notes on Specification.—(1) Where copper capping comes in contact with any galvanized iron, such as ridgings, hips, etc., the faces of the two metals should be insulated against each other in an approved manner. (2) If desired, other suitable glass may be used in lieu of that specified.

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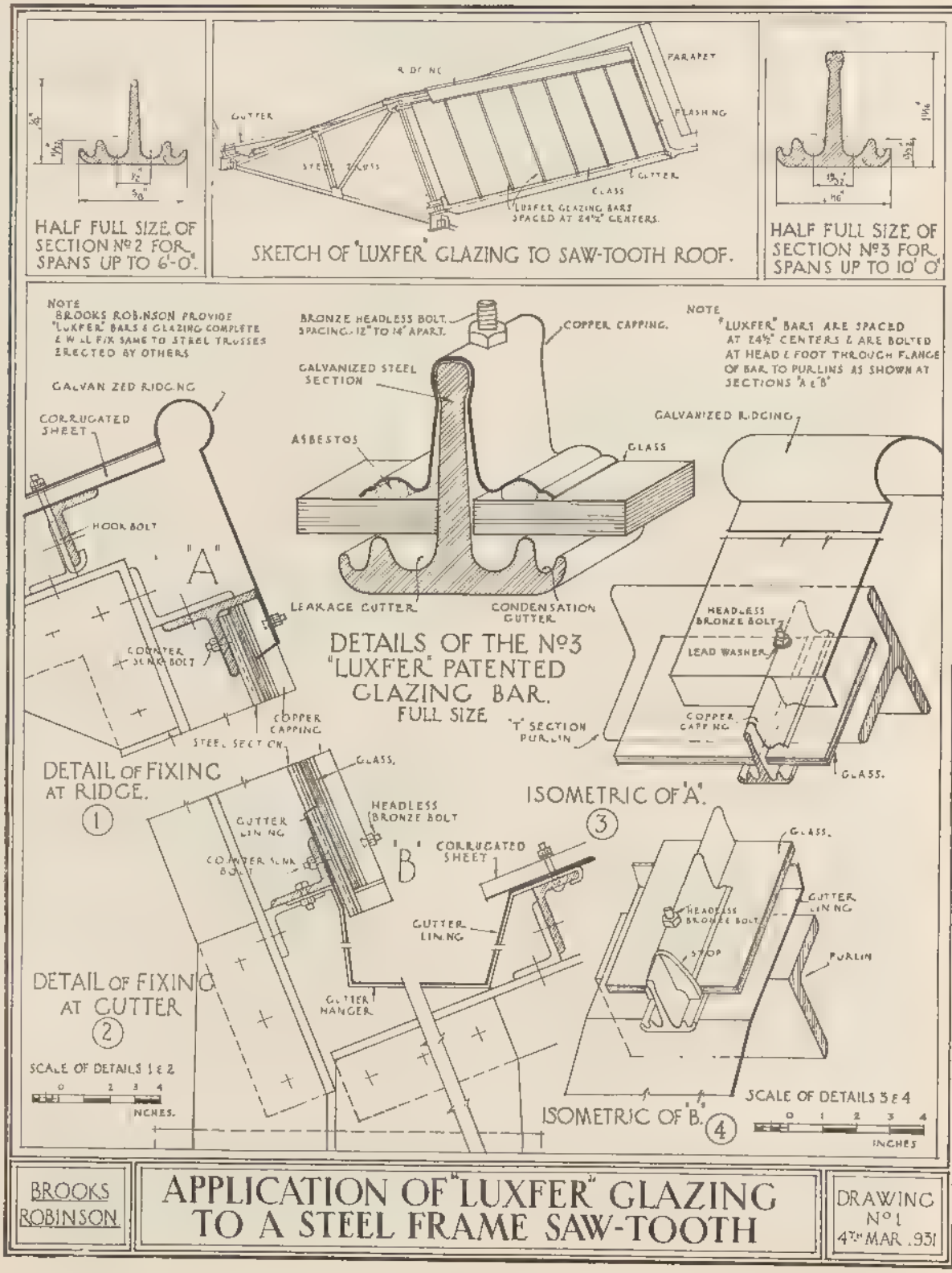

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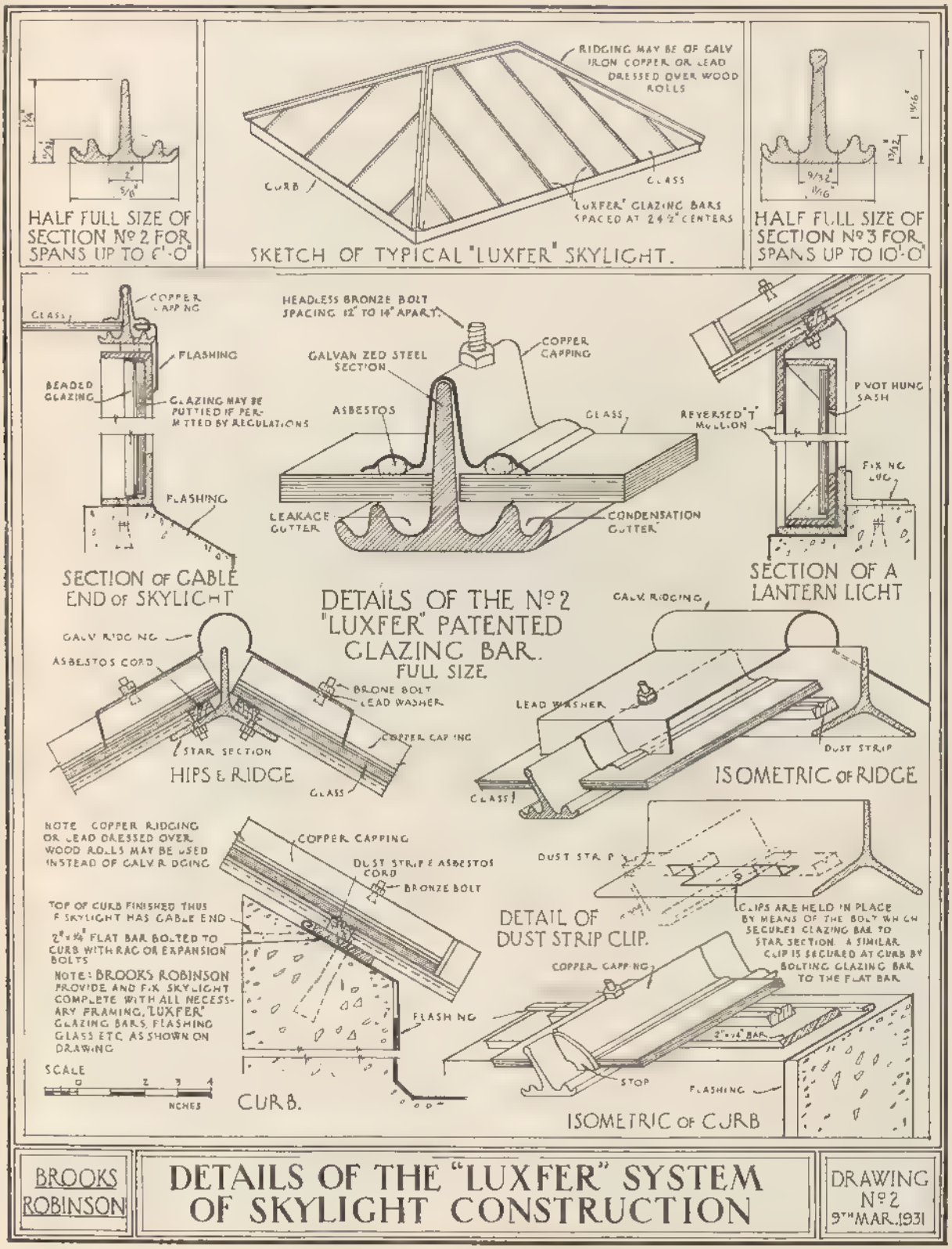

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12

S.A.A. File No.

AUSTRAL BRONZE COMPANY LTD.

SYDNEY AND MELBOURNE
Established 1915

Head Office and Works:
BRASS AND COPPER ROLLING MILLS, O'RIORDAN ST., ALEXANDRIA, SYDNEY, N.S.W.
Branch Office and Bulk Store:
101-103 KING STREET, MELBOURNE
Selling Agents:
NOYES BROS. (Sydney) Ltd., 115 CLARENCE ST., SYDNEY

SHEET COPPER

[For Other Products, See Index]

SHEET COPPER APPLIED TO ROOF COVERING, GUTTERS AND DOWN PIPES

Permanent

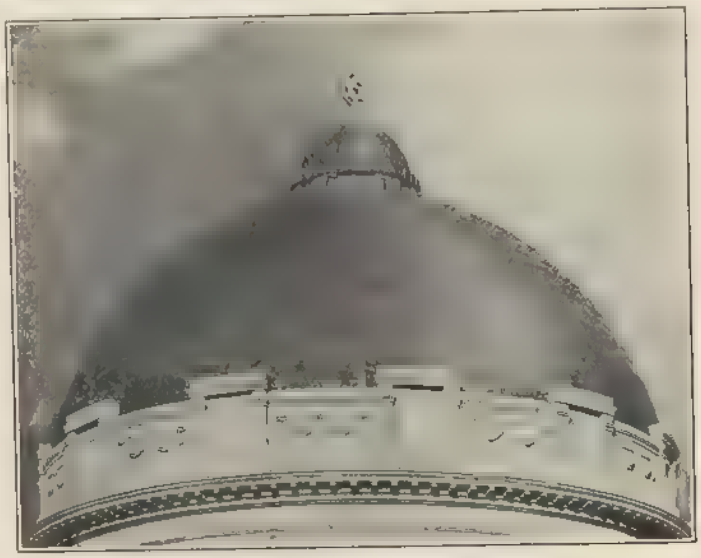
Copper is an excellent material for general Sheet Metal purposes, particularly for roofing, gutters, downpipes, flashings, ridging, rainwater heads and cornices. Its physical and chemical characteristics make it an outstanding metal for long service under severe conditions.

A copper roof will last for generations probably centuries. Numerous important buildings, as well as many fine residences throughout the world, have copper roofs - some of them over 300 years old.

Retards Corrosion

Copper retards appreciably the corrosive action of acid fumes, and is a most effective material for use under extreme atmospheric conditions such as are found in manufacturing localities and cities. Near the sea coast and in country districts its durability is unquestioned.

The green coating or patina, which appears on copper after exposure to the atmosphere, is mainly basic copper sulphate and chloride, which, acting as a shield against deterioration, also makes a most beautiful roofing material which does not require painting or special protection of any kind.



Dome of New Synagogue, Melbourne. Covered with the Finest Hot-Rolled Sheet Copper. Manufactured by Austral Bronze Company Limited.

Economical

Freedom from repairs or maintenance expenses, combined with durability, makes copper one of the most suitable and best roofing materials obtainable. It has higher salvage value than other metal used for building purposes, and, being indestructible, it can be salvaged from any structure destroyed, and will always sell for a substantial figure.

Details of Application

The Company will be pleased to send a copy of its handbook, "Sheet Copper — Its Application to Roof Covering," to Architects, Master Builders, Plumbers and others interested in the application of sheet copper to building construction.

BRIEF DATA ON THE APPLICATION OF SHEET COPPER

WEIGHT AND GAUGE OF SHEET COPPER

Copper sheets are made in all gauges up to 31 I.S.W.G. They are usually defined by the oz. weight per sq. ft., that is, "16 oz. copper" means copper weighing 16 oz. per sq. ft. or 24 I.S.W.G.

RECOMMENDED WEIGHT OF METAL

Do not use lighter than 16 oz. copper. Hard copper is generally used for down pipes, eaves gutters, and cornice work. Soft copper, as it is more easily workable, is used elsewhere—especially where bends, etc., are necessary.

EAVES GUTTERS AND DOWNPIPES *(See Points 13 and 14 on opposite page)*

These may be obtained in similar sections to those available in galvanised sheet metal. Hangers for eaves gutters can be of cast bronze or brass, and of strap copper or brass. Downpipes should be held in position by brass wall hooks, or heavy brass or copper straps.

FLASHINGS *(See Points 1, 2, 6, 7 on opposite page)*

Flashings should be at least 4 inches high and project not less than 4 inches out on to the roof. Cap flashings should be turned down over base flashings not less than 4 inches. Stepped flashings, when not soldered, should lap at least 2 inches. Exposed edges of flashing are folded under ½ inch so as to provide stiffness, and prevent lifting by the wind.

VALLEY GUTTERS *(See Point 3 on opposite page)*

Valley Gutters should be in long sheets and project up at least 4 inches under roofing tiles. The edges of sheets should be turned back ½ inch, and be secured with copper cleats fixed to valley boarding.

ROOFING *(See Points 5, 9, 10, 15 on opposite page)*

1. Copper sheets should be laid on building paper or roofing felt on T. & G. decking.
2. Avoid sharp bends.
3. Never nail copper sheets. Use cleats.
4. Nail copper cleats with copper nails—never iron or steel.
5. Allowance for the expansion and contraction of copper sheets should be provided by, (a) forming the edges to make locked seams with adjacent sheets, and fixing each sheet to roof decking with cleats, and soldering the seams thus formed, or (b) by fixing wood rolls or battens to the roof decking and securing the sheets with cleats nailed to the rolls, and covering the rolls with copper capping. The first method would be similar to that used at Points Nos. 5 and 15 on the opposite page. The second method similar to that used at Points Nos. 9 and 10. Cross seams in the latter would be made similarly to the former.

SOLDER

The only solder which should be used is the best 50-50 solder obtainable. It must be composed of new tin and new lead.

COPPER IN CONTACT WITH OTHER METALS

The possibility of galvanic action between copper and iron or steel should be avoided by proper insulation, such as—

1. By covering the steel member with asbestos.
2. By placing strips of sheet lead between the two metals.
3. By heavily tinning the iron.

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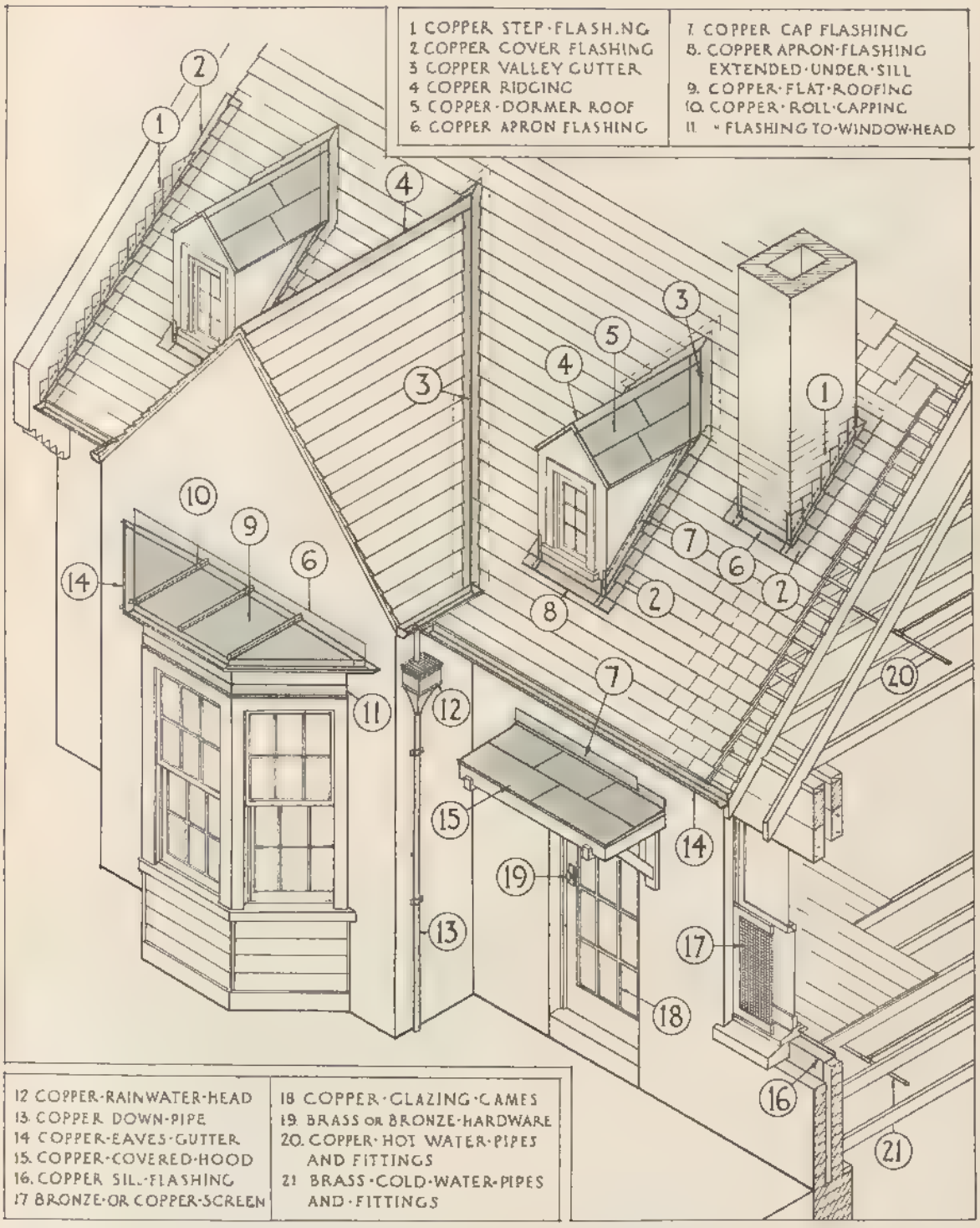

SYDNEY AND MELBOURNE

·APPLICATIONS·OF·COPPER·&·BRASS· ·TO·DOMESTIC · BUILDINGS ·

AUSTRAL BRONZE CO LTD.

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12*i*

S.A.A. File No.

MALLEYS LTD.

MANUFACTURERS OF SKYLIGHTS
GENERAL SHEETMETAL ENGINEERS
AIR CONDITIONING ENGINEERS, ENAMELLERS, SHERIDISERS AND TINNERS

Head Office and Showroom:
50-52 MOUNTAIN STREET, SYDNEY

Factory:
McEVOY STREET, ALEXANDRIA

Postal Address: Box 2, G.P.O., George Street West, Sydney.
Brisbane Branch: Waters Street, Valley.

SUNRISE

(For Other Products, See Index)

Malleys' Patent Skylights Mean More Daylight

They provide natural light and ample ventilation, and are used extensively in buildings of every description. Made for every roof under the sun.

Malleys' Patent Skylights (Opening Type)

The sizes and glazing are exactly the same as Fig. 1. Inset shows the special reinforcement of frame and the clips which secure and hold the glass.

NO LEAKS
NO DANGER

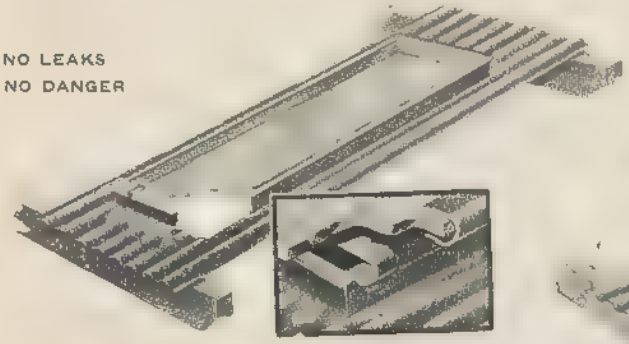
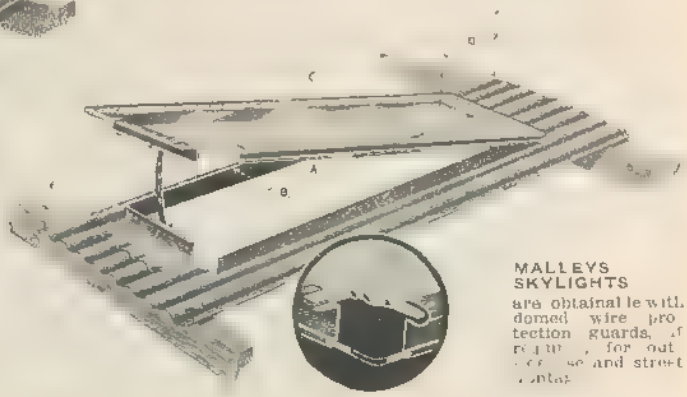


Fig. 1.



MALLEYS SKYLIGHTS are obtainable with domed wire protection guards, [illegible] for out[illegible] and street [illegible]

Fig 2

Malleys' Patent Skylight (Fixed Type)

A most dependable skylight, built of reliable materials—guaranteed watertight. Glazed with $\frac{3}{16}$ mill rolled glass. Obtainable also with $\frac{1}{4}$ in wire-cast glass. The inset shows the method of fixing the glass to render the skylight watertight and leak-proof. As can be observed, packing is quite unnecessary The deep channel for draining also prevents any leak around the glass. In stock sizes the light area is in the centre of the sheet, and measures approximately 39 in. long x 16¼ in. wide.

MALLEYS SKYLIGHTS (Stock Sizes)
Length of Sheets—6, 7, 8, 9, 10, 11 and 12 ft.
Sizes of Glazing—3 ft. 6 in. x 1 ft. 6 in.
Gauge of Iron—26 or 24.

WHEN ORDERING SPECIAL SKYLIGHTS
The following details (as shown in Fig. 2) are necessary
C—Length of sheet.
A & B—Size of light area.
D—Distance from end of sheet to inside light area.
Fixed or opening type.
Glazing mill-rolled or wire-cast.
State gauge of sheet.

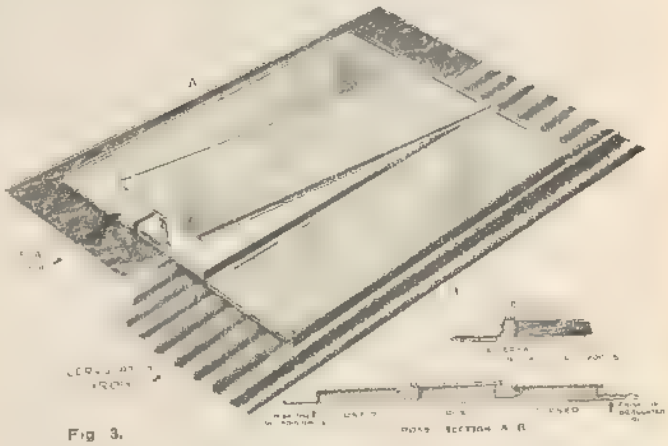


Fig 3.

Malleys' Patent Skylights—Multiple Lights (Fixed or Opening Types)

The illustration here shows a treble light, which can be had in either plain or corrugated iron The sections show very clearly the construction, also simple details for fixing on either corrugated iron or malthoid roofs.

(Continued on next page)

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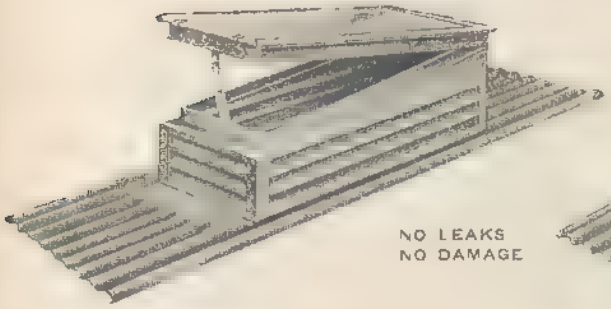
MALLEYS' SKYLIGHTS MEAN FRESH AIR, LIGHT AND HEALTH

MADE FOR EVERY ROOF UNDER THE SUN



NO LEAKS
NO DAMAGE

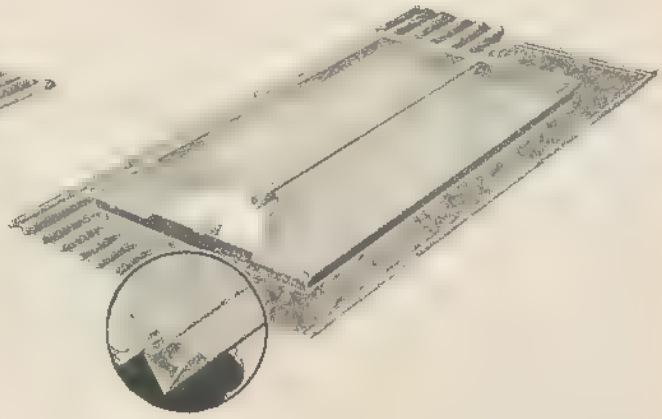


Fig. 4.

Fig. 5.

Malleys' Ventilated Skylights (Fixed or Open Type)

Made, as illustrated, in stock sizes or to any desired length and width. A very popular type for factories and warehouses. Used extensively throughout the State.

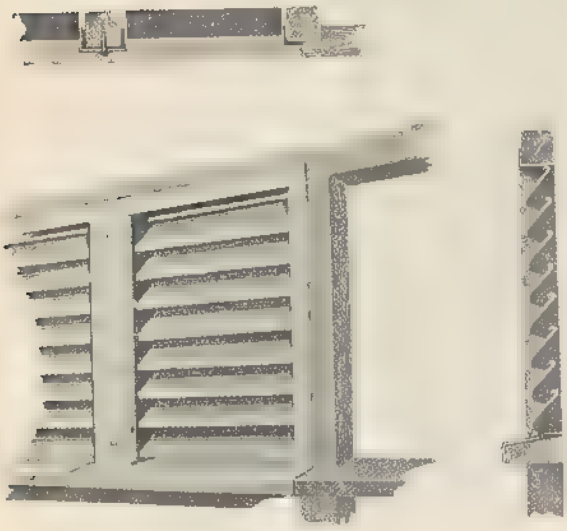
Malleys' skylights are without doubt the strongest and most secure skylights manufactured. Install them on your buildings and get the full benefits of natural lighting and natural ventilation

Malleys' Double Skylights for Flat and Corrugated Roofs

The inset in Fig. 5 shows Malleys' Shadowless Glazing Bar, a special feature in Malleys' skylights for the lighting of glass houses, studios and buildings where every particle of natural light is required.

Please Note.—Malleys' Patent Skylights are made of flat iron for tile, slate, fibro or flat roofs (mention composition of your roof when ordering).

MALLEYS' GALVANISED IRON VENTILATORS



Showing Ventilator Built In.

Advantages

These ventilators are most practical and far in advance of the old style glass vents. Made for any sized opening, or to special detail. As compared with the old style glass vents, they are stronger, easier to fix, cheaper, unbreakable, and far more weatherproof.

Construction Features

The galvanised iron frame is of great rigidity, the louvres being of double-lipped section, as shown in sectional view, which not only imparts great rigidity to the whole ventilator, but also prevents driving rain from entering the building. The frame forms a flashing on the sill and frame, as indicated in the sectional plan

Fixing is easy, the ventilator is simply set into the opening, which has been framed up for it and screwed to the vertical members.

Louvres made adjustable or fixed as required.

(continued on next page)

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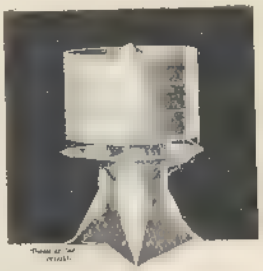
"SUNRISE" SUCTION ROOF VENTILATORS (PAT. APP. 931/31) (STORMPROOF)

The Ventilation Problem

The successful ventilation of industrial and commercial buildings depends directly on the achievement of correct answers to these fundamental questions: How many roof ventilators will be needed to ventilate the building effectively and economically? What should be the size of these ventilators? Just how and where should the ventilators be installed for best results?

Equipped with an installation of "Sunrise" Ventilators, a building will be ventilated with maximum efficiency and at the lowest cost obtainable with such efficiency, for every "Sunrise" Ventilator installation is based on facts. A scientifically designed wind tunnel has been installed to test the "Sunrise" Ventilator, thus guesswork and rough estimates are eliminated.



The "Sunrise" Roof Ventilator

The Need of Ventilation

The importance of properly ventilating buildings is well recognised by those responsible for greater efficiency and production in commercial and industrial undertakings.

A properly ventilated room increases the mental and physical efficiency of the worker to a remarkable degree, and the output of manual workers has increased upwards of 33 1-3 per cent. as a result of improved methods of ventilation.

For many purposes natural draught ventilation is more suitable than artificial ventilation, a better distribution is often obtained and the initial cost of installing is, as a rule, considerably less. There are no running costs, and the use of the "Sunrise" Positive Ventilating Cowl will ensure the requisite minimum number of changes of air per hour.

OPERATION OF "SUNRISE" VENTILATORS

We have been manufacturing automatic natural draught ventilators for 30 years and our ventilators are tested in our practically designed wind tunnel with the most improved scientific instruments, with the result that we are able to furnish actual exhausting capacity data with the "Sunrise" Natural Draught Ventilator. The "Sunrise" Ventilator is designed to make use of either, or both, of the two distinct natural forces that are available to produce air currents These forces are **stack or thermal action** and **wind action.**

Operating Principles of "Sunrise" Ventilators. Patent app. 931/31.

Stack action occurs when air in a stack is heated above the temperature of the surrounding atmosphere, this action is independent of wind velocity and ceases when the temperatures inside and outside of the stack are equalised

The stack action is proportional to the height of the building, being greater in tall buildings; and is also proportional to the temperature difference being greater at high temperatures Wind action is the effect of passing winds blowing across the top and bottom of the suction band, creating a suction in the ventilation pipe, resulting in a strong upward air exhausting movement proportional to the velocity of the wind

The design of the "Sunrise" Ventilator combines the greatest possible draught with the least possible resistance to air flow and ensures a plentiful supply of fresh air The action at low wind velocities may be independent of temperature differences, and the ventilator is always on duty; the air in the buildings is "fresh" to commence the day, and the freshness is maintained at all times.

Fresh air openings should be arranged in the sides of buildings in the form of opening windows or doors and should have an area of at least twice the area of the cowls. These openings can be partly or altogether closed when restricted ventilation is required, or dampers may be fitted in the ventilator pipes when specially ordered.

Automatic dampers with fusible links (which close the ventilator when a fire starts, thus cutting off the draught) will be fitted to "Sunrise" Ventilators when specially ordered. "Sunrise" Rectangular Ventilating Cowls can be supplied to meet special requirements and to harmonise with architectural designs of buildings. We are equipped to manufacture cowls up to 10 ft. diameter or larger equivalent rectangular sizes.

The table of exhausting capacities of the "Sunrise" Ventilators is based upon tests on commercial cowls under service conditions.

Moisture Removal

In the ventilation of steam process rooms, the number of changes of air per hour will be based on the amount of steam to be carried away by the air The moisture carrying effect of the air is shown in the following table:—

STEAM CARRYING CAPACITY OF AIR AT VARIOUS TEMPERATURES

Air Temp Fahr	40	51	60	72	82	89	95
Lbs. Steam per 1,000 ft air	½	¾	1	1½	2	2½	3

Thus, for a 10 deg rise in temperature the increased moisture carrying capacity of air is approximately ½ lb. per 1,000 cubic feet, in other words, 2,000 cubic feet of air will satisfactorily remove one pound of water vapour or steam. The standard finish of the "Sunrise" Ventilator is Galvanized. Where required for a steamy atmosphere, Ventilators will be coated with our special corrosion resistant, or made of non corrosive materials when specially ordered Bird wire will be fitted when specially ordered.

(Continued on next page)

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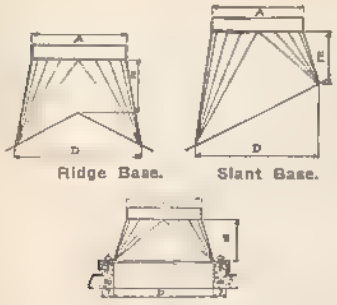


"SUNRISE" VENTILATION BASES

Bases can be furnished with "Sunrise" Ventilators to meet the requirements of any kind of roof. The three types diagrammed above are most commonly used. Types Nos. 1 and 2 are made to fit roofs of any slope. Type 3 is made to fit over wood, concrete, or other curbs, when ordering, give size of opening and curb thickness.

Selection of Ventilators

The table of exhaust capacities has been based on tests carried out in our large wind tunnel and cover the range of conditions usually met with in Australia.

In selecting suitable sizes of "Sunrise" Cowls it is necessary to know the quantity of air to be exhausted and the conditions under which the cowl is required to work, such as the height of the ventilator above the fresh air intakes and the permissible excess of temperature inside above that of the outside air and the allowable wind velocity, and with these values a reference to the table will indicate at a glance the size of the required unit ventilator.

For Example:—A building 100 ft. x 100 ft. x 20 ft. high requires the air changing twice per hour, select a suitable unit ventilator.

The bays of the building may be taken as 25 ft. x 25 ft., and it would be suitable to fit ventilators at centre of such bays, thus the number of ventilators would be—

100 divided by 25 = 4 x 4 = 16

The cubical contents of the building is 100 x 100 x 20 = 200,000 cubic feet, and as air requires changing twice each hour, the volume of air to be exhausted equals 200,000 x 2 = 400,000 cubic feet per hour, or 6,666 cubic feet per minute.

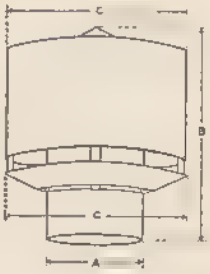
The quantity of air per ventilator equals 6,666 divided by 16 = 416 cubic feet per minute.

The permissible temperature rise is to be approximately 10 degrees, and the height from inlet to cowl is 28 feet, and allowable wind two miles per hour, and under these headings the table gives an output of 380 cubic feet for an 18 in. and 555 cubic feet for a 20 in. ventilating cowl, and for this building, 16-18 in. ventilating cowls could be used, with a temperature rise of 11 degrees.

It is necessary to check if the calculated air movement will carry off the steam emitted from boiling pans in this building, quantity 50 pounds per hour, with a 10 degree rise, 50 lb. of steam can be handled by 100,000 cubic feet per hour and the air movement allowed.—400,000 cubic feet per hour will very easily carry away the 50 lb. of steam.

DIMENSIONS OF "SUNRISE" COWLS AND BASES

COWLS				BASES		
Shaft A	B	C	C	Shaft A	D	E
inches	inches	inches	inches	inches		inches
9	16½	17	18	9	12 in. x 12 in.	10
12	22⅝	22¾	24	12	16 in. x 16 in.	10
15	28⅞	28¼	30	15	20 in. x 20 in.	10
18	32¾	34	36	18	24 in. x 24 in.	10
20	35⅞	37¼	40	20	28 in. x 28 in.	10
24	45	45¾	48	24	32 in. x 32 in.	12
30	55⅝	57	60	30	38 in. x 38 in.	14
36	67⅞	67½	72	36	45 in. x 45 in.	16



Cowl.

TABLE OF EXHAUST CAPACITIES OF "SUNRISE" VENTILATORS GUARANTEED

Inside Excess Temperature.	Wind Velocity, Miles per Hour.	Height of Ventilator above Intake, viz., Doors, Windows, etc.	Cubic Feet per Minute. Sizes of Ventilators in Inches Diameter Shaft							
			9 in.	12 in.	15 in.	18 in.	20 in.	24 in.	30 in.	36 in.
Fahr		Feet								
0°	2		28	50	76	110	160	200	305	440
	4		56	100	127	225	315	400	610	880
	6		85	150	230	335	475	600	920	1,350
	8		118	210	305	460	640	830	1,220	1,800
	10		148	265	383	570	800	1,060	1,530	2,300
5°	2	10	63	110	170	250	355	440	680	990
		20	76	135	209	305	435	540	835	1,215
		30	89	155	240	350	500	620	960	1,390
		40	95	170	265	385	550	680	1,060	1,530
		50	104	185	288	415	600	745	1,150	1,660
	4	10	90	160	246	360	510	635	985	1,420
		20	104	185	285	415	590	735	1,140	1,640
		30	119	210	315	460	655	820	1,260	1,850
		40	126	225	340	500	710	890	1,360	1,980
		50	135	240	382	540	760	940	1,450	2,130
	6	10	115	205	322	465	670	825	1,290	1,860
		20	129	230	360	520	750	925	1,440	2,080
		30	146	250	390	670	815	1,010	1,560	2,260
		40	153	270	420	610	870	1,070	1,670	2,400
		50	160	285	440	640	920	1,130	1,750	2,560
	8	10	146	260	400	580	835	1,030	1,600	2,340
		20	153	280	440	630	920	1,130	1,750	2,520
		30	175	310	470	690	990	1,220	1,875	2,750
		40	180	320	500	720	1,040	1,280	2,000	2,850
		50	191	340	540	780	1,100	1,350	2,150	3,030
	10	10	180	320	475	720	1,000	1,280	1,900	2,880
		20	195	346	525	760	1,100	1,380	2,100	3,110
		30	205	360	562	810	1,175	1,440	2,250	3,320
		40	214	380	600	850	1,250	1,520	2,400	3,420
		50	225	400	640	900	1,300	1,600	2,550	3,560
10°	2	10	76	135	210	305	435	540	840	1,210
		20	95	170	265	380	550	650	1,060	1,530
		30	115	200	308	450	640	800	1,230	1,800
		40	124	220	343	495	715	880	1,370	1,980
		50	135	240	375	540	780	960	1,500	2,160
	4	10	104	185	285	415	590	740	1,140	1,650
		20	124	220	340	495	710	880	1,360	1,970
		30	140	250	385	560	800	1,000	1,540	2,250
		40	155	270	423	610	880	1,080	1,690	2,440
		50	162	290	457	650	940	1,160	1,830	2,620
20°	2	10	95	170	264	380	550	680	1,055	1,530
		20	124	220	342	495	715	880	1,370	1,980
		30	146	260	403	585	840	1,040	1,610	2,340
		40	162	290	452	656	940	1,160	1,810	2,620
		50	180	320	500	720	1,030	1,280	2,000	2,880
	4	10	124	220	340	495	710	880	1,360	1,970
		20	152	270	420	610	875	1,080	1,670	2,430
		30	174	310	480	695	1,000	1,240	1,910	2,770
		40	191	340	530	750	1,070	1,360	2,120	3,060
		50	210	370	575	840	1,200	1,480	2,300	3,300

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N.A.A. File No.

WUNDERLICH LIMITED

Manufacturers of

Wunderlich Building Materials

Administration: BAPTIST STREET, REDFERN, SYDNEY, N.S.W.

Showrooms and Offices:

SYDNEY: Baptist Street, Redfern.
STH. MELBOURNE: 210 Hanna Street.
ADELAIDE: Grote and Morphett Streets.
PERTH: Lord and Short Streets.
BRISBANE: Amelia Street, Valley
NEWCASTLE: Builders' Exchange, King St.
HOBART: 139 Macquarie Street.
LAUNCESTON: 71 St. John Street.

[For Other Products, See Index]

Wunderlich Metal Products

Wunderlich Building Materials include several Products of outstanding importance, and these are featured separately in this Catalogue. Others of lesser significance, although widespread in their application, are mentioned below

Galvanized EXTERIOR WALL LININGS, in Sheets measuring 6 ft. by 3 ft. and 6 ft. by 2 ft.; patterned to imitate Roughcast, Rockface and Brickwork Particularly effective for Shop premises, Public Halls and Cinemas in country districts.

Galvanized FISHSCALE SHEETING, size 6 ft by 3 ft., for Turret Roofing, Gable Fillings, etc.

Galvanized SHINGLE PATTERN, in Sheets 6 ft. by 3 ft, for Gable Fillings and Balcony Fronts

Zinc, Copper and Galvanized Steel INTERLOCKING TILES, with secret fixing, for Domes, Turrets and Mansard Roofs. Rectangular and Diamond patterns

Zinc HIPROLLS and CRESTINGS, in various ornamental designs, supplied in approximate 7-ft. lengths.

Zinc FINIALS and WEATHERVANES, stocked in a wide range of designs.

Galvanized WINDOW HOODS, comprising Fishscale Pattern Hood, ornamental Brackets and Frieze; made in parts for ready assembling with bolts and nuts

Galvanized VENT RIDGING, birdproofed, as approved by Public Health Departments; suitable for Churches, Cinemas, and other buildings where roof ventilation is required

Galvanized LOUVRED VENT PANELS for Walls and Roofs, made to any dimensions.

"Hit or Miss" METAL WALL VENTILATORS, sizes 9 in. by 6 in. and 9 in. by 3 in.; with adjustable slide to regulate the volume of air admitted

Galvanized UPDRAFT ROOF COWLS, with tubing, Bellmouths and Bellmouth Rings, to any dimensions.

Hurricane SKYLIGHTS, entirely of Galvanized Steel. Can be used with tile, slate or iron roofs. Puttyless glazing.

All metal GLAZING BARS for Glass Roofs; with or without Tee Iron Reinforcement. Made for overlapping sheets of glass, or for single lengths. Puttyless, and with ample allowance for expansion and contraction.

Zinc CAPITALS and CONSOLES, in a wide range of designs, for enrichment to columns and beams.

Metal CEILING CENTREFLOWERS of various designs and sizes, for ceiling ventilation

Steel and Galvanized "WUNDERTILE" SHEETING, in Sheets 6 ft. by 2 ft, patterned to look like 4 inch square tiles. Suitable for the lining of Bathrooms, Kitchens, Corridors, Counter Fronts, etc.

METAL LETTERS, with or without vitreous enamel filling, for signs to buildings

NAMEPLATES; cast, stamped, repousse or built, for city buildings and also for dwellings

DIRECTORY BOARDS, in metals or wood, for entrances and vestibules of Office Buildings, etc

AWNING FASCIAS in a variety of designs, and in copper, zinc or galvanized steel, for modern suspended awnings

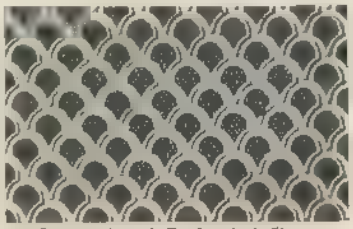
Printed Literature

Illustrations, prices and printed literature relating to these Wunderlich Products will be furnished, post free, on request.

Displays at Showrooms

Interesting examples of Wunderlich sundry manufacturers, in Metal, are displayed at our Showrooms in each State

Part Galvanised Vent Ridge



Stamped and Perforated Zinc Ventilating Sheeting

Cast Zinc Vent

Galvanised Inlet Vent Approved by Board of Health

Hinged and Ventilated Galvanized Skylight.

Cast Bronze Vent

Glazing Bar, made for both overlapping and single sheets of glass.

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

WUNDERLICH LIMITED

Manufacturers of

Wunderlich Metal Ceilings

Administration: BAPTIST STREET, REDFERN, SYDNEY, N.S.W

Showrooms and Offices:

SYDNEY: Baptist Street, Redfern.
STH. MELBOURNE: 210 Hanna Street.
ADELAIDE: Grote and Morphett Streets.
PERTH. Lord and Short Streets.
BRISBANE: Amelia Street, Valley.
NEWCASTLE: Builders' Exchange, King St.
HOBART: 139 Macquarie Street.
LAUNCESTON: 71 St. John Street.

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S A A File No

[For Other Products, See Index]

Stock Designs

Wunderlich Metal Ceilings are manufactured in paint-primed Steel, in a wide variety of designs, comprising Panellings, Diaper patterns, deeply coffered Panels, Borders, Cornices, Mouldings, Soffits and Centre Flowers; also complete ceiling treatments in period design. A selection of these designs is available also in unpainted Galvanised Steel.

Wunderlich Metal Wall Linings

In addition, there is offered a liberal range of patterns for Interior Wall Linings, including Sheetings, Dado Panels, Mouldings, Architraves, Rails and Friezes.

Special Ceilings

Ceilings in Steel, Zinc, Copper or Bronze, to architects' drawings or to designs by Wunderlich artists, are specially manufactured as required.

Stock Sizes

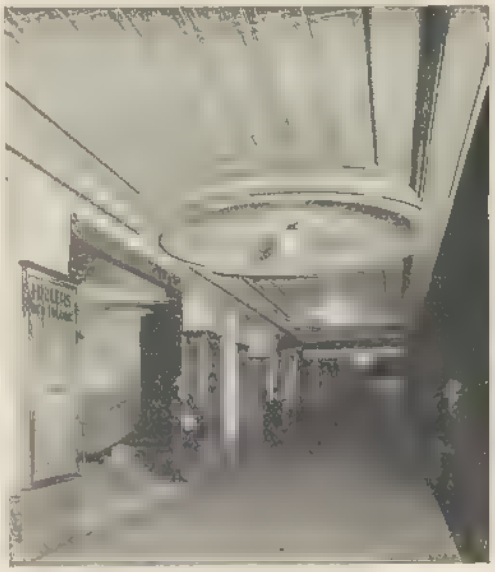
Ceiling and Wall Lining designs are made in Sheets measuring 6 ft. by 2 ft. or 6 ft. by 3 ft ; deeply embossed patterns, in Panels 2 ft. by 2 ft.; and Cornices, Mouldings, etc., in 6 ft. lengths.

Light Weight

Weighing somewhat less than 5 lbs. to the square yard, Wunderlich Metal Ceilings can be installed with safety in buildings of all types

Qualities and Advantages

The Wunderlich Designs are varied in range, and of high artistic quality. Being of embossed Metal, the material transports compactly, without risk of damage; and ordinary tradesmen can erect it. All joints consist of tightly-fitting lapped beads, which obviate the use of cover mouldings and offer no refuge for dust or vermin. Once erected, the Ceilings cannot crack, warp, sag flake, rot or fall down. They are SAFE always—and a highly efficient fire retardant.



Ceiling Treatment, with Wunderlich stock patterns, to an awning.

Method of Fixing

Wunderlich Metal Ceilings should be applied to close boarding or— the more usual method—to wooden battens not less than 1½ ins. by 1 in., spaced at 12-in. centres; with cross battens cut in where necessary to provide fixing for the ends of Ceiling Sheets. The Metal material should be secured to battens, with ⅞-in. by 16 gauge flat-head galvanised nails.

Easily Applied over Plaster

Being comparatively light in weight, Wunderlich Metal Ceiling are particularly suitable for installation over cracked or faulty plaster ceilings. This work can be carried out cleanly and tidily; often with no disturbance of the existing ceiling.

Painting and Decorating

Oils Paints only should be used on Wunderlich Metal Ceilings. Although costing more than water paints, they retain their appearance and quality much longer, and afford the metal surface maximum protection.

Designs and Estimates

On request, sketch designs or working drawings, together with estimates, will be furnished—for work of any magnitude.

"Fixing" Service

In each State we maintain a staff of competent Wunderlich Ceiling "Fixers," so we are able to undertake the complete installation of Ceilings.

Experience

The Industry came into existence in the year 1888, when Wunderlich Ceilings were erected in the Sydney Town Hall — the area comprising 2,500 square yards. This ceiling is intact to-day, showing no sign of wear and tear; as good as when erected

Catalogues

Copies of Wunderlich Catalogues, price-lists and other printed literature will be supplied on request.

Ceilings Installed Recently

The most important Wunderlich Ceiling Treatments carried out recently are those to the Head Offices of the Government Savings Bank of N.S.W. and the Bank of N.S.W.; both in Sydney. These comprise immense areas of classic treatment, reproduced in painted and Galvanized Steel and Zinc.

(Continued on next page)

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

Wunderlich Hinged Mock Beams, in Steel – Government Savings Bank of N.S.W., Sydney

Metal Ceilings Fulfil a New Function

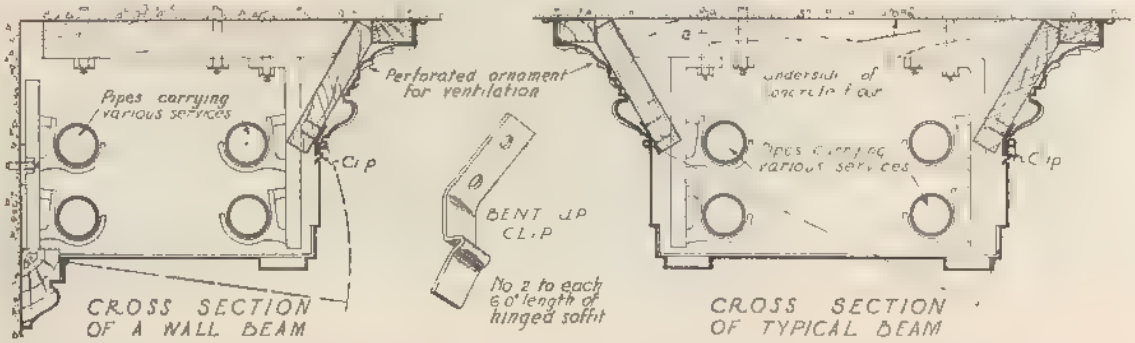
A Wunderlich Ceiling Treatment of particular interest to architects designing city buildings is that to the Head Office of the Government Savings Bank of N.S.W., where Mock Beams of Steel and Zinc, HINGED to open, have been installed on nine floors Secreted in the Mock Beams is the piping carrying various services, and the hinged metalwork provides ready access to this, at the same time fulfilling all demands from the viewpoint of artistic effect

In the above illustration, six sections of metal casing are shown in the "open" position It will be seen that if repairs, alterations or extensions of the pneumatic system or the heating and electricity services become necessary, immediate access to the tubes and piping is obtained by the opening of the Mock Beams.

This scheme marks a distinct advance on the usual system of carrying these services in the concrete floors, and has become practicable only through the employment of Metal for the hinged casing. Brittle and organic materials would not withstand the severe treatment to which the metal work will be subjected over a period of years.

The sectional drawings printed below explain the construction adopted. Each section of steel casing, comprising the soffit and fascias, is stamped in one piece, and strengthened with a reinforcement of strip steel, attached transversely at regular intervals. One edge of the casing is hinged and fixed along the bottom member of the cornice. The other edge, strengthened with a rolled finish, is slotted at intervals, so that with the casing in a closed position, the slots spring over projecting nibs in special clips fixed below the cornice A small lug at each end of the steel casing facilitates handling during the closing and opening operations

It is apparent that the hinged casings not only fulfil successfully their practical function, but also form a pleasing and interesting feature of the interior treatment of the Bank.



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SECTION F

[Containing S.A.A. Filing Sections Nos. 13 and 14]

STRUCTURAL STEEL AND MISCELLANEOUS STEEL AND IRONWORK

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

13b S.A.A. File No.	THE BROKEN HILL PROPRIETARY CO. LIMITED IRON AND STEEL MASTERS HEAD OFFICE: MELBOURNE OFFICES: LONDON — SYDNEY — ADELAIDE PERTH WORKS: Iron Ore Mines:—Iron Knob, S.A. Limestone Mines:—Devonport, Tasmania Mills:—Newcastle, N.S.W.	B.H.P.

Products

The products manufactured at the Company's Iron and Steel Works, Newcastle, include: Pig Iron, Steel Ingots, Blooms, Slabs, Billets, Light and Heavy Tee Rails and Fishplates, Bridge Rails, Plates, Structural Shapes, Alloy Steels, and a varied range of Flat, Round, Square, Angle and Tee Sections, Octagons, Wire Rods and Reinforcing Bars; also Tar, Solvent Naphtha, Ammonium Sulphate, Benzol, Toluol, Xylol. Hard coke for foundry purposes, coal and household coal. Crushed Slag for concrete and road making.

Pig Iron

Pig Iron manufactured by the Broken Hill Proprietary Company Limited is produced from high-grade ore, all iron being carefully graded by chemical analysis, which method ensures that consumers obtain a regular and uniform product.

Steel

B.H.P. Steel is produced by the Basic and Acid Open Hearth Processes. The steel meets the requirements of Standard Specifications, the Admiralty, Lloyds, the Chief Engineers of the Commonwealth and State Railways and other Government Departments of Australia. During manufacture and subsequent rolling operations, all steel is subject to close supervision, ensuring a high-grade product.

Special Steels

A varied range of special steels is produced at Newcastle; for further information covering characteristics, particulars and uses, write or call at any of the Company's offices.

View of Open Hearth Furnaces, Tapping Side, Newcastle

Steel Sections

B.H.P. structural sections are rolled from steel to the Australian Standard Specifications for Structural Steel A 1/1928.

Rolling Margin

The recognised rolling margin for Structural Sections is 2½ per cent. above or below the weights listed.

Weight of Steel

The weight of Steel Sections listed are theoretical only, and are based on the sectional area of a piece of steel 1 in. square and 1 ft. long, weighing 3.4 lbs., or 1 cubic ft. of steel weighing 489.6 lbs.

Cutting to Lengths

Lengths of all sections ordered are subject to a cutting margin of 2 in. in the length, which may be taken as 1 in. above or below the ordered lengths, or 2 in. over to nothing under, at the buyer's option.

Testing

Modern testing machines and chemical laboratories form an integral portion of the Company's Iron and Steel Works. All tests and investigations are conducted under the supervision of a skilled technical staff.

Technical Service

The Company directs special attention to the fact that the services of a Technical Staff are also available for all users of B.H.P. Iron and Steel Products. This service, if desired, covers the selection of special irons and steels, and assistance in the solution of any problems which may arise in the Foundry, Forge or Machine Shop.

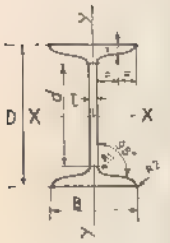
(Continued on next page)

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

TABLE I.

DIMENSIONS AND PROPERTIES OF I BEAMS (Rolled Steel Joists).

TABLE I.



Reference Marks		Size D x B Inches	Weight per ft Lbs	Diagram: Web t	Diagram: Flange T	Diagram: Radius R_1	Diagram: Radius R_2	Sectional Area Inches²	Moment of Inertia: About XX	Moment of Inertia: About YY	Radius of Gyration: About XX	Radius of Gyration: About YY	Modulus of Section: About XX	Modulus of Section: About YY	Size D x B Inches
		24 x 7½*	100	.64	.984	.73	.30	29.4	2581.4	63.55	9.37	1.47	215.12	16.68	24 x 7½*
NBSB 18		24 x 7½	90	.52	.984	.73	.36	26.465	2443.227	60.436	9.608	1.511	203.602	16.116	24 x 7½
NBSB 17		22 x 7	75	.50	.834	.69	.34	22.064	1676.796	41.065	8.718	1.364	152.436	11.733	22 x 7
NBSB 16	ASB 21	20 x 6½	65	.45	.820	.65	.32	19.119	1226.172	32.559	8.008	1.305	122.617	10.018	20 x 6½
NBSB 15	ASB 20	18 x 6	55	.42	.757	.61	.30	16.182	841.759	23.625	7.221	1.209	93.529	7.878	18 x 6
NBSB 14	ASB 18	16 x 6	50	.40	.726	.61	.30	14.705	618.092	23.468	6.483	1.236	77.261	7.489	16 x 6
NBSB 13	ASB 17	15 x 6	45	.38	.655	.61	.30	13.236	491.918	19.871	6.096	1.225	65.588	6.624	15 x 6
NBSB 12	ASB 16	14 x 5½	40	.37	.627	.57	.28	11.765	377.059	14.788	5.661	1.121	53.866	5.377	14 x 5½
NBSB 11	ASB 15	13 x 5	35	.35	.604	.53	.26	10.298	283.507	10.815	5.247	1.025	43.616	4.326	13 x 5
NBSB 8	ASB 14	12 x 8	65	.43	.904	.77	.38	19.122	487.76	65.184	5.051	1.846	81.295	16.296	12 x 8
NBSB 10	ASB 13	12 x 5	30	.33	.567	.53	.26	8.827	206.931	8.770	4.842	.997	34.488	3.508	12 x 5
BSB 19		10 x 8	70	.60	.97	.70	.35	20.60	344.90	71.67	4.09	1.86	68.98	17.92	10 x 8
NBSB 7	ASB 12	10 x 8	55	.40	.783	.77	.38	16.17	288.688	54.743	4.224	1.840	57.738	13.686	10 x 8
NBSB 9	ASB 10	10 x 4½	25	.30	.595	.49	.24	7.354	122.338	6.486	4.079	.939	24.468	2.883	10 x 4½
NBSB 8	ASB 9	9 x 4	21	.30	.457	.45	.22	6.177	81.127	4.148	3.624	.820	18.028	2.074	9 x 4
NBSB 4	ASB 8	8 x 6	35	.35	.648	.6[illegible]	.30	10.296	115.058	13.540	3.343	1.378	28.764	6.513	8 x 6
NBSB 7	ASB 7	8 x 4	18	.28	.398	.45	.22	5.296	55.629	3.506	3.241	.814	13.907	1.753	8 x 4
NBSB 6	ASB 6	7 x 3½	15	.25	.398	.41	.20	4.416	35.904	2.408	2.851	.738	10.258	1.376	7 x 3½
NBSB 3	ASB 5	6 x 5	25	.33	.561	.53	.26	7.37[illegible]	45.162	9.876	2.479	1.159	15.064	3.951	6 x 5
NBSB 2	ASB 4	6 x 3	12	.23	.377	.37	.18	3.533	20.989	1.461	2.437	.643	6.996	.974	6 x 3
NBSB 4		5 x 2½	9	.20	.347	.33	.16	2.647	10.910	.789	2.030	.546	4.364	.631	5 x 2½
NBSB 1	ASB 3	4 x 3	10	.24	.347	.37	.18	2.940	7.786	1.326	1.627	.672	3.893	.884	4 x 3
		3 x 2½	5.7	.17	.262	.27	.10	1.693	2.55	.418	1.22	.497	1.70	.358	3x2½

*Nominal Size. Width about 7⅝" Note—This Section may be altered. Sizes and Properties are for NBS Beam with Thickened Web.

TABLE 2.

ROLLED STEEL I BEAMS AS GIRDERS.

SAFE DISTRIBUTED LOAD IN TONS, ABOUT AXIS X-X.

TABLE 2

Size Inches	Weight per ft Lbs.	SPAN IN FEET. 2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	36	40	Size Inches
24 x 7½*	100				124.9	1.47	92.6	85.9	71.7	63.7	57.4	52.1	47.8	44.1	41.0	38.2	35.8	31.9	28.7	24 x 7½*
24 x 7½	90					98.3	90.5	77.5	67.8	60.3	54.3	49.4	45.2	41.7	38.7	36.2	34.0	30.1	27.1	24 x 7½
22 x 7	75				88.2	81.2	67.7	58.0	50.7	45.1	40.6	36.9	33.8	31.2	29.0	27.1	25.4	22.6	20.3	22 x 7
20 x 6½	65				72.3	65.4	54.5	46.7	40.8	36.3	32.7	29.7	27.2	25.1	23.3	21.8	20.4	18.2	16.3	20 x 6½
18 x 6	55				61.5	49.9	41.6	35.6	31.2	27.6	24.9	22.7	20.8	19.2	17.8	16.6	15.6	13.8	12.4	18 x 6
16 x 6	50			51.4	51.5	41.2	34.3	29.4	25.7	22.8	20.6	18.7	17.2	15.8	14.7	13.7	12.9	11.4	10.3	16 x 6
15 x 6	45			48.0	46.7	38.0	29.1	25.0	21.8	19.4	17.4	15.8	14.5	13.4	12.5	11.6	10.9	9.7	8.7	15 x 6
14 x 5½	40			40.24	35.9	28.6	23.[illegible]	20.5	17.9	15.9	14.3	13.0	11.9	11.0	10.2	9.5	8.9	7.9	7.1	14 x 5½
13 x 5	35		39.1	38.7	28.1	25.3	19.3	16.6	14.5	12.9	11.6	10.5	9.6	8.9	8.3	7.8	7.2	6.4	5.8	13 x 5
12 x 8	65				46.4	43.4	35.1	30.9	27.1	24.1	21.7	19.7	18.1	16.7	15.5	14.6	13.5	12.0	10.9	12 x 8
12 x 5	30		34.2	33.6	22.9	18.4	15.3	13.1	11.5	10.2	9.2	8.3	7.7	7.1	6.5	6.1	5.7	5.1	4.6	12 x 5
10 x 8	70			54.0	46.9	36.8	30.6	26.2	23.0	20.4	18.4	16.7	15.3	14.1	13.1	12.2	11.4			10 x 8
10 x 8	55				36.[illegible]	30.8	25.6	21.9	19.2	17.1	15.4	14.0	12.8	11.8	10.9	10.2	9.6			10 x 8
10 x 4½	25		26.7	21.7	16.3	13.0	[illegible]	[illegible]	8.1	7.2	6.5	6.0	5.4	5.0	4.6	4.3	4.1			10 x 4½
9 x 4	21	24.3	24.0	16.0	12.0	9.6	[illegible]	5.5	6.0	5.3	4.8	4.4	4.0	3.7	3.4					9 x 4
8 x 6	35			25.2	19.2	15.3	12.8	10.9	9.6	8.5	7.7	6.9	6.4	5.9	5.5					8 x 6
8 x 4	18	20.2	18.5	12.4	9.3	7.4	6.2	5.3	4.6	4.1	3.7	3.4	3.1	2.8	2.6					8 x 4
7 x 3½	15	15.7	13.7	9.1	6.8	5.5	4.6	3.9	3.4	3.0	2.7	2.5	2.3	2.1						7 x 3½
6 x 5	25		17.8	13.4	8.0	8.0	6.7	5.7	5.0	4.5	4.0	3.6								6 x 5
6 x 3	12	12.2	9.3	6.[illegible]	4.[illegible]	3.7	[illegible]	2.7	2.3	2.1	1.9									6 x 3
5 x 2½	9	9.0	5.8	3.9	2.9	2.3	1.9	1.6	1.4											5 x 2½
4 x 3	10	8.6	5.2	3.5	2.6	2.1	1.7	1.5	1.3											4 x 3

*Nominal Size. Width about 7⅝"

For Dimensions and Properties, see Table 1.

Girders to have usual side supports as in building work.

The tabular values of the safe distributed dead loads for the various spans of beam, as given above, are based on an allowable fibre stress of 8 tons per square inch.

To find the safe distributed dead load giving an extreme fibre stress of 7½ tons per square inch, multiply the tabular load values by $\frac{15}{16}$

Tabular loads to right of heavy zig-zag line produce deflection greater than $\frac{1}{360}$ in. per foot of span

(Continued on next page)

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

TABLE 3. TABLE 3

DIMENSIONS AND PROPERTIES OF ROLLED STEEL CHANNELS.

ANGLE a
NBSC 95°
BHPC 98°

Reference Marks		Size D x B Inches	Weight per Foot Lbs	Standard Thickness t	Standard Thickness T	Radii R_1	Radii R_2	Sectional Area—Inches²	Centre of Gravity Distance C	Moment of Inertia About X-X	Moment of Inertia About Y-Y	Radius of Gyration About X-X	Radius of Gyration About Y-Y	Modulus of Section About X-X	Modulus of Section About Y-Y	Size D x B Inches.
NBSC17	ASC11	15 x 4	36.37	.41	.62	.60	30	10 696	.967	349 095	13 338	5.713	1 117	46 546	4 398	15 x 4
NBSC15	ASC10	12 x 3½	29.23	.40	.60	.54	27	8.596	.901	180.292	8.436	4.580	.991	30 049	3 [illegible]	12 x 3½
NBSC13	ASC 9	10 x 3½	24 46	.36	56	.54	27	7 193	985	109 520	7 426	3 902	1 016	21.904	2.927	10 x 3½
NBSC10	ASC 8	9 x 3	17 46	.30	44	.48	.24	5 130	781	62.522	3 752	3 489	.855	13 894	1 [illegible]	9 x 3
NBSC 8	ASC 7	8 x 3	15 96	28	.44	48	.24	4 694	834	46.720	3.578	3.155	.873	11.680	1 [illegible]	8 x 3
NBSC 6	ASC 6	7 x 3	14 22	.26	.42	.48	24	4 182	875	32.750	3.255	2.798	882	9 357	1 531	7 x 3
NBSC 4	ASC 5	6 x 3	12 41	.25	38	.48	24	3.650	.895	21 271	2.825	2.414	.880	7.090	1 339	6 x 3
NBSC 3	ASC 4	5 x 2½	10.22	.25	.38	42	21	3.006	773	11 873	1.641	1.987	.739	4.749	[illegible]	5 x 2½
NBSC 2	ASC 3	4 x 2	7 09	.24	.31	.36	.18	2.085	599	5.067	703	1 558	.581	2.532	[illegible]	4 x 2
NBSC 1	ASC 2	3 x 1½	4.60	.20	.28	.30	15	1.352	.476	1.823	261	1 161	.439	1 215	[illegible]	3 x 1½
BHPC		3 x 1¾	7 58	.44	.34	.37	.31	2.252	.569	2 690	456	1 09	.45	1 79	386	3 x 1¾
BHPC		3 x 1½	8.855	56	.34	.37	.31	2 627	.603	2.971	757	1 96	537	1.98	[illegible]	3 x 1½

TABLE 4. TABLE 4.

ROLLED STEEL CHANNELS AS GIRDERS. (Braced to Prevent Twisting).

SAFE DISTRIBUTED LOADS IN TONS. ABOUT AXIS X-X.

Size Inches	Weight per Foot Lbs	SPAN IN FEET 2	4	6	8	10	12	14	16	18	2	22	24	26	28	30	32	36	40	Size Inches
15 x 4	36 [illegible]	55 31	[illegible]	[illegible]	31 [illegible]	24 8[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	12 41	1[illegible] 28	10 34	9 54	8.86	8.27	7 76	6 89	6.20	15 x 4
12 x 3½	29 23	43 20	[illegible]	28 71	20 [illegible]	[illegible]	13 3[illegible]	11 45	[illegible]	8 [illegible]	8 01	7 28	6 68	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	12 x 3½
10 x 3½	24 46	32 40	[illegible]	19 4[illegible]	14 6[illegible]	11 68	[illegible]	8 34	7 30	6 49	5 84	[illegible]	4 8[illegible]	4 49	4 17	3 89	3 66			10 x 3½
9 x 3	[illegible] 46	[illegible]	18.5[illegible]	[illegible]	[illegible]	[illegible] 41	[illegible] 47	5 20	4 63	4 12	[illegible]	[illegible]	[illegible]	2 86	2.65	2 47				9 x 3
8 x 3	15.96	20.16	15.57	10.38	7.79	6.23	5 19	4.45	3.89	3 46	3 11	2.83	2 59							8 x 3
7 x 3	14.22	16.38	12.48	8.32	6 24	4.99	4.16	3 56	3 12	2 77	2 49	2.27								7 x 3
6 x 3	12.41	13 50	9 45	6 30	4.73	3.78	3.15	2.70	2.36	2 10	1.89									6 x 3
5 x 2½	10 22	11 26	6 33	4 22	3 16	2 53	2 11	1 81	1 58											5 x 2½
4 x 2	7 09	6 76	3 38	2 25	1 69	1 35	1 13													4 x 2
3 x 1½	4.60	3 24	1.62	1 08	81	65														3 x 1½

The tabular values of the safe distributed dead loads for the various spans of beam, as given above, are based on an allowable fibre stress of 8 tons per square inch

To find the safe distributed dead load giving an extreme fibre stress of 7½ tons per square inch, multiply the tabular load values by $\frac{15}{16}$.

Tabular loads to right of heavy zig-zag line produce deflection greater than $\frac{1}{325}$ in. per foot of span.

(Continued on next page)

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

Table 5.

SINGLE ROLLED STEEL I BEAMS AS COLUMNS OR STRUTS.

SAFE LOADS FOR VARIOUS HEIGHTS OR LENGTHS.

Size D x B Inches	Weight per Foot Lbs.	Least Rad Gyration Inches.	SAFE CONCENTRIC LOADS IN TONS FOR LENGTHS IN FEET															Size D x B Inches
			4	5	6	7	8	9	10	11	12	14	16	18	20	22	24	
24 x 7½*	100	1.47	189.0	181.1	173.3	165.4	157.5	149.7	141.8	133.9	126.0	110.6	94.5	78.8				24 x 7½*
24 x 7½	90	1.511	170.9	164.0	157.2	150.3	143.4	136.5	129.6	122.7	115.8	102.0	88.2	74.4	60.6			24 x 7½
22 x 7	75	1.361	[illegible]	133.6	127.3	120.9	114.5	108.2	101.8	95.4	89.1	76.3	63.6	50.9				22 x 7
20 x 6½	65	1.305	120.3	114.6	108.8	103.0	97.3	91.5	85.7	80.0	74.2	62.7	51.1					20 x 6½
18 x 6	55	1.209	100.2	95.0	89.7	84.5	79.2	73.9	68.6	63.4	58.1	47.6	38.9					18 x 6
16 x 6	50	1.236	91.6	86.9	82.2	77.5	72.8	68.2	63.5	58.8	54.1	44.7	35.4					16 x 6
15 x 6	45	1.225	82.3	78.0	73.8	69.5	65.3	61.0	56.8	52.5	48.3	39.7	31.3					15 x 6
14 x 5	40	1.121	71.7	67.6	63.4	59.3	55.2	51.1	46.9	42.8	38.7	30.4						14 x 5½
13 x 5	35	1.025	61.3	57.4	53.4	49.6	45.6	41.7	37.7	33.7	29.8							13 x 5
12 x 8	65	1.846	124.3	123.0	118.9	114.9	109.8	105.7	101.6	97.6	93.5	85.3	77.2	69.0	60.9	52.7	44.6	12 x 8
12 x 5	30	.997	56.0	52.4	48.8	45.1	41.5	37.8	34.2	30.6	26.9							12 x 5
10 x 8	70	1.86	133.9	132.7	128.3	124.0	119.6	115.3	110.9	106.6	102.2	93.5	84.7	76.0	67.3	58.6	49.9	10 x 8
10 x 8	55	1.84	105.2	104.0	100.6	97.1	93.7	90.2	86.7	83.3	79.8	72.8	66.0	59.1	52.1	45.2	38.3	10 x 8
10 x 4½	25	.939	42.8	39.7	36.6	33.6	30.5	27.4	24.3	21.2	18.1							10 x 4½
9 x 4	21	.82	34.5	31.5	28.5	25.6	22.6	19.6	16.7									9 x 4
8 x 6	35	1.378	66.4	63.5	60.5	57.6	54.6	51.7	48.8	45.7	42.8	36.9	31.00	25.1				8 x 6
8 x 4	18	.814	30.0	27.5	25.1	27.7	20.2	17.9	15.3									8 x 4
7 x 3½	15	.738	23.7	21.4	19.0	16.7	14.3	11.9	9.6									7 x 3½
6 x 5	25	1.159	45.1	42.6	40.1	37.7	35.2	32.7	30.2	27.7	25.2	20.2						6 x 5
6 x 3	12	.643	17.8	15.7	13.5	11.4	9.2											6 x 3
5 x 2½	9	.546	12.2	10.3	8.4	6.5												5 x 2½
4 x 3	10	.672	15.2	13.4	11.7	10.0	8.3	6.5										4 x 3

* Nominal Size. Width act. 7⅝".

Explanation of Table 5

Table 5 of safe loads on single rolled steel I-beam as columns is calculated by the straight line formula, 7.5 - .0328 l/r, maximum 6.5 tons per sq in. on the gross cross-sectional area with static axial loading, on the assumption that the ends are fixed or adequately constrained laterally as in usual building practice.

Before using this table it would be advisable to consult the local building regulations, as these may require that a different column formula should be used.

Rounds

Diameter. (Ins.)	Cross-Sectional Area. (Sq. Ins.)	Weight per Ft. (Lbs.)
[illegible]	.0491	.167
[illegible]	.0767	.261
[illegible]	1105	.376
[illegible]	1503	.511
[illegible]	.1964	668
[illegible]	.2485	.845
[illegible]	3068	1.043
[illegible]	.3712	1.262
[illegible]	.4418	1.5
[illegible]	.5185	1.760
[illegible]	6013	2.04
[illegible]	6903	[illegible]
1	.7854	2.67
1 [illegible]	8866	[illegible]
1 [illegible]	9904	3.36
1 [illegible]	1.1075	3.760
1 [illegible]	1.2272	4.19
1 [illegible]	1.3530	4.600

Rounds—(*continued*)

Diameter (Ins.)	Cross-Sectional Area. (Sq. Ins.)	Weight per Ft (Lbs.)
1⅝	1.4849	5.05
1 5/16	1.6230	5.520
1½	1.7671	6.01
1 9/16	1.9175	6 520
1⅝	2 0739	7.05
1 11/16	2 2365	7.603
1¾	2.4053	8.178
1 13/16	2.5802	8 771
1⅞	2.7612	9.388
1 15/16	2.9483	10.023
2	3.1416	10.681
2⅛	3.5466	12.056
2¼	3.9761	13.518
2⅜	4.4301	15.062
2½	4.9087	16.688
2⅝	5.4119	18 398
2¾	5.9396	20.192
2⅞	6 4918	22.070
3	7 0686	24.030

Flats

[illegible] in. x 5/16 in., rising by 1/32 in. to ⅝ in. x [illegible]
¾ in. x ⅛ in., rising by 1/32 in. to ⅞ in. x [illegible]
1 in. x ⅛ in., rising by 1/32 in. to 1⅜ in. x [illegible]
[illegible] in. x ⅛ in., rising by 1/32 in. width and 1/16 in. [illegible] 3½ in. x 1 in.
[illegible] x ⅛ in., rising by 1/16 in. to 3⅝ in. x ½ in.
3 [illegible] in. x 1/32 in., rising by 1/16 in. to 3¾ in. x ⅜ in.
4 in. x [illegible] in.
4 in. x ¼ in., rising by ⅛ in. to 4 in. x 1 in.
4½ in. x ⅜ in., rising by ⅛ in. to 4½ in. x 1 in.
5 in. x ¼ in., rising by ⅛ in. to 5 in. x 1 in.

Flats—(*continued*)

[illegible] in. x ½ in., rising by ⅛ in. to 5½ in. x 1 in.
6 in. x ¼ in., rising by ⅛ in. to 6 in. x 1 in.
6½ in. x ⅜ in., rising by ⅛ in. to 6½ in. x 1 in.
[illegible] x ⅜ in. rising by ⅛ in. to 7 in. x 1 in.
[illegible] in. x ½ in., rising by ⅛ in. to 7½ in. x 1 in.
8 in. x ¼ in., rising by ⅛ in. to 8 in. x 1¼ in.
9 in. x ¼ in., rising by ⅛ in. to 9 in. x ¾ in.
10 in. x 3/16 in.
10 in. x ¼ in., rising by ⅛ in. thickness to 10 in. x 1 in.
12 in. x 3/16 in.
12 in. x ¼ in., rising by ⅛ in. thickness to 12 in. x 1 in.

(Continued on next page)

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

Equal Angles

Size—Inches.		Weight per Ft. Lbs.
8 × 8 ×	5/8	32.68
	3/4	38.89
	7/8	45.00
	1	51.01
6 × 6 ×	5/8	14.82
	1/2	19.55
	5/8	24.17
	3/4	28.69
	1	37.40
5 × 5 ×	5/16	10.30
	3/8	12.23
	1/2	16.16
	5/8	19.93
	3/4	25.59
4 × 4 ×	5/16	8.17
	3/8	9.72
	1/2	12.72
	5/8	15.67
3½ × 3½ ×	5/16	7.11
	3/8	8.45
	1/2	11.05
	5/8	13.55
3 × 3 ×	3/16	3.71
	1/4	4.89
	5/16	6.05
	3/8	7.17
	1/2	9.35
	5/8	11.42
2½ × 2½ ×	3/16	3.07
	1/4	4.04
	5/16	4.98
	3/8	5.90
	1/2	7.65
2¼ × 2¼ ×	3/16	2.75
	1/4	1.06
	5/16	1.31
	3/8	1.55
2 × 2 ×	1/8	1.65
	3/16	2.43
	1/4	3.19
	5/16	3.92
	3/8	4.62
1¾ × 1¾ ×	3/16	2.11
	1/4	2.76
	5/16	3.39
	3/8	3.99
1½ × 1½ ×	1/8	1.23
	3/16	1.79
	1/4	2.34
	5/16	2.85

Equal Angles—*Continued*

Size—Inches.		Weight per Ft. Lbs.
1¼ × 1¼ ×	1/8	1.02
	3/16	1.48
	1/4	1.91
1 × 1 ×	1/8	.80
	3/16	1.15
	1/4	1.49

Unequal Angles

Size—Inches.		Weight per Ft. Lbs.
6½ × 4½ ×	5/8	13.64
	1/2	17.84
	5/8	22.04
	3/4	26.13
6 × 4 ×	5/8	12.28
	1/2	16.16
	5/8	19.93
	3/4	23.59
6 × 3½ ×	5/8	11.63
	1/2	15.30
	5/8	18.86
	3/4	22.31
5 × 4 ×	5/8	11.00
	1/2	14.45
	5/8	17.80
5 × 3 ×	1/4	6.60
	3/16	8.17
	3/8	9.72
	1/2	12.75
	5/8	15.67
4 × 3 ×	3/16	7.11
	3/8	8.45
	1/2	11.05
	5/8	13.55
3½ × 3 ×	3/16	6.58
	3/8	7.81
	1/2	10.20
	5/8	12.49
3½ × 2½ ×	1/4	4.89
	5/16	6.05
	3/8	7.17
	1/2	9.35
3 × 2 ×	1/4	[illegible]
	3/16	[illegible]
	[illegible]	[illegible]
	[illegible]	[illegible]
2½ × 2 ×	3/16	[illegible]
	1/4	3.62
	5/16	[illegible]
	3/8	[illegible]

Steel Plates

Maximum weight of finished sheared plate—2,700 lbs.

The plate widths listed below are [illegible] as [illegible], [illegible] all [illegible] rounded at [illegible] widths can also be produced.

The plate lengths listed **above the irregular heavy black line indicate** the maximum dimensions of plates which can be rolled for given gauges, and cannot be rolled to equal the maximum weight of 2,700 lbs.

The plates listed **below the irregular black line** can all be rolled to equal the maximum weight of 2,700 lbs.

Thickness in inches (Fractions)	Thickness in inches (Decimal)	Wgt. in lbs. per sq. ft.	Widths in inches									
			24	30	36	42	48	54	60	66	72	80
3/16 in.	.187	7.65	480	480	480	480	480	444	396	348	300	150
1/4 in.	.250	10.20	480	480	480	480	480	444	396	348	300	150
5/16 in.	.312	12.75	480	480	480	480	480	444	396	348	300	16[illegible]
3/8 in.	.375	15.30	48[illegible]	480	480	48[illegible]	8[illegible]	[illegible]	[illegible]	348	3[illegible]	[illegible]
7/16 in.	.437	17.85	480	480	8[illegible]	8[illegible]	5[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1/2 in.	.500	20.40	480	480	48[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	288	[illegible]	[illegible]
9/16 in.	.562	22.95	480	48[illegible]	47[illegible]	[illegible]	[illegible]	15[illegible]	28[illegible]	[illegible]	[illegible]	160
5/8 in.	.625	25.50	480	480	42[illegible]	[illegible]	17[illegible]	28[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
11/16 in.	.687	28.05	480	462	[illegible]	[illegible]	288	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3/4 in.	.750	30.60	480	42[illegible]	[illegible]	[illegible]	264	2[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
13/16 in.	.812	33.15	480	[illegible]	25[illegible]	[illegible]	[illegible]	[illegible]	19[illegible]	[illegible]	[illegible]	[illegible]
7/8 in.	.875	35.70	453	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	181	[illegible]	[illegible]	[illegible]
1 in.	1.000	40.80	397	[illegible]	204	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1-1/8 in.	1.125	45.90	353	282	235	201	176	[illegible]	[illegible]	28[illegible]	[illegible]	[illegible]
1-1/4 in.	1.250	51.00	317	254	21[illegible]	181	[illegible]	141	[illegible]	[illegible]		
1-3/8 in.	1.375	56.10	288	23[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1-1/2 in.	1.500	61.20	264	211	176	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	88	[illegible]
1-5/8 in.	1.625	66.30	244	1[illegible]	[illegible]	[illegible]	122	[illegible]	97	83	81	7[illegible]
1-3/4 in.	1.750	71.40	226	181	151	[illegible]	[illegible]	[illegible]	[illegible]	82	[illegible]	[illegible]
1 7/8 in.	1.875	76.50	211	[illegible]	141	[illegible]	[illegible]	[illegible]	84	[illegible]	[illegible]	[illegible]
2 in.	2.000	81.60	198	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

E.M.F. Electric Co. Pty. Ltd.

1059 RATHDOWN ST., NORTH CARLTON, VICTORIA

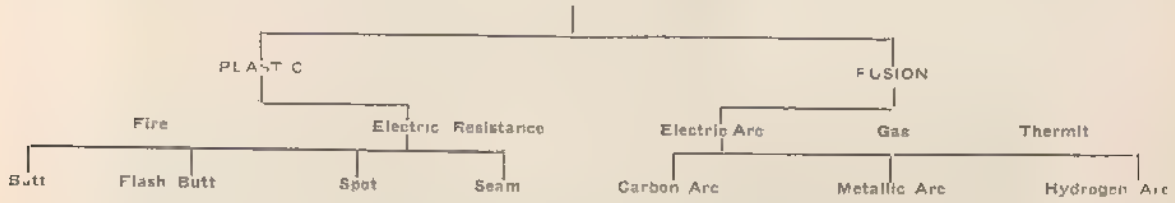
DISTRIBUTORS

Edmunds Bros. & Co., 187a Flinders Lane, Melbourne
Evans, Deakin & Co., Charlotte Street, Brisbane.
Atkins (W.A.) Ltd., 894 Hay Street, Perth.
E.M.F. Welding Distributors, 31 Meagher Street Chippendale, N.S.W.
Edmunds Bros. & Co., 134 Weymouth Street, Adelaide
Edmunds Bros. & Co., A.M.P. Building, Customs House Quay, Wellington, N.Z.
Marshall & Co., 29 Club Arcade, Durban, South Africa.
Chas. Bingham & Co., 34 Victoria Street, Westminster London S.W.1

13c2

S.A.A. File No.

Welding Processes



Electric Welding

Resistance Welding

In resistance welding the welding heat is obtained by the resistance of the metal to be welded to a low voltage heavy density alternating current, the machine being designed to apply pressure when the metal reaches a plastic state. Butt, Flash Butt, Spot and Seam Welding are the main forms of this type of welding.

Electric Arc Welding

In arc welding the welding heat is obtained by passing a current between an electrode and the metal to be welded across a gap of air or other gases. The intense heat of the "arc" thus formed causes local fusing of the metal to be welded and the melting of a metallic electrode provides the weld metal which is deposited in the required position.

E.M.F. Electrodes

E.M.F. Electrodes are provided for the following purposes:—

For General Welding in Mild Steel and Wrought Iron	**E.M.F. Mild Steel Electrodes.**
	,, Mild Steel Overhead Electrodes.
	,, Weld Rods.
For important structural work, boiler, forging and special work	**,, New Era Electrodes.**
For production work	**,, Smooth Running Boiler Electrodes.**
For high carbon steel deposit subject to heat treatment	**,, High Carbon Electrodes.**
For welding on rail and similar steel	**,, Rail Rods Electrodes.**
For self-hardening steel deposit	**,, Hollite Electrodes.**
For welding Staybrite steel	**,, Staybrite Electrodes.**
For welding Poldi steels, A.K.V.W., A.K.C., etc.	**,, Poldi A.K.V.W., A.K.C. Electrodes.**
For depositing an Austenitic steel on any ferrous base	**,, Austerods**
For welding Cast-iron	**,, Cold Cast-Iron Electrodes.**
	,, Hot Cast-Iron Electrodes.
	,, Cupronick Electrodes.
For building up with a fair quality metal	**,, Arc Rods.**
For welding Manganese steels	**,, Manganese Electrodes.**
For Special Purposes	**,, Special Alloy and non-ferrous Electrodes are supplied on demand, and as required, within the limits of the process.**

Welded Construction of Buildings

It is now 16 years since the first application of arc welding to buildings, and 10 years since the inception of the work here in Australia. During this period, the number of welded structures has been steadily growing, and there are examples to be found of practically all types of structures, ranging from light portable and semi-portable buildings up to seven-story buildings.

During this period, design has changed from the mere substitution of welding for rivets to a design differing in many respects to standard riveted work. Tentative Standard Specifications have been put forward, and have been exhaustively tried out, some two or three hundred miles of welding having been satisfactorily carried out under the tentative specifications. Supervision is now no longer a bar to the adoption of this form of construction, and, furthermore, the practical requirements of the building industry can now be met by the large number of firms equipped and capable of carrying out welded work by contract in the ordinary way of business.

The quality of the welding itself has improved greatly. In the case of the E.M.F. New Era Electrode, the ultimate tensile strength of the deposited weld metal is 29 tons per square inch, as compared with 25 tons for the earlier electrodes, with good ductility and the very high and consistent Izod shock strength of 40 ft. lbs. or over, as compared with an average value of less than half this figure as obtained with the earlier electrodes.

(Cont. nued on next page)

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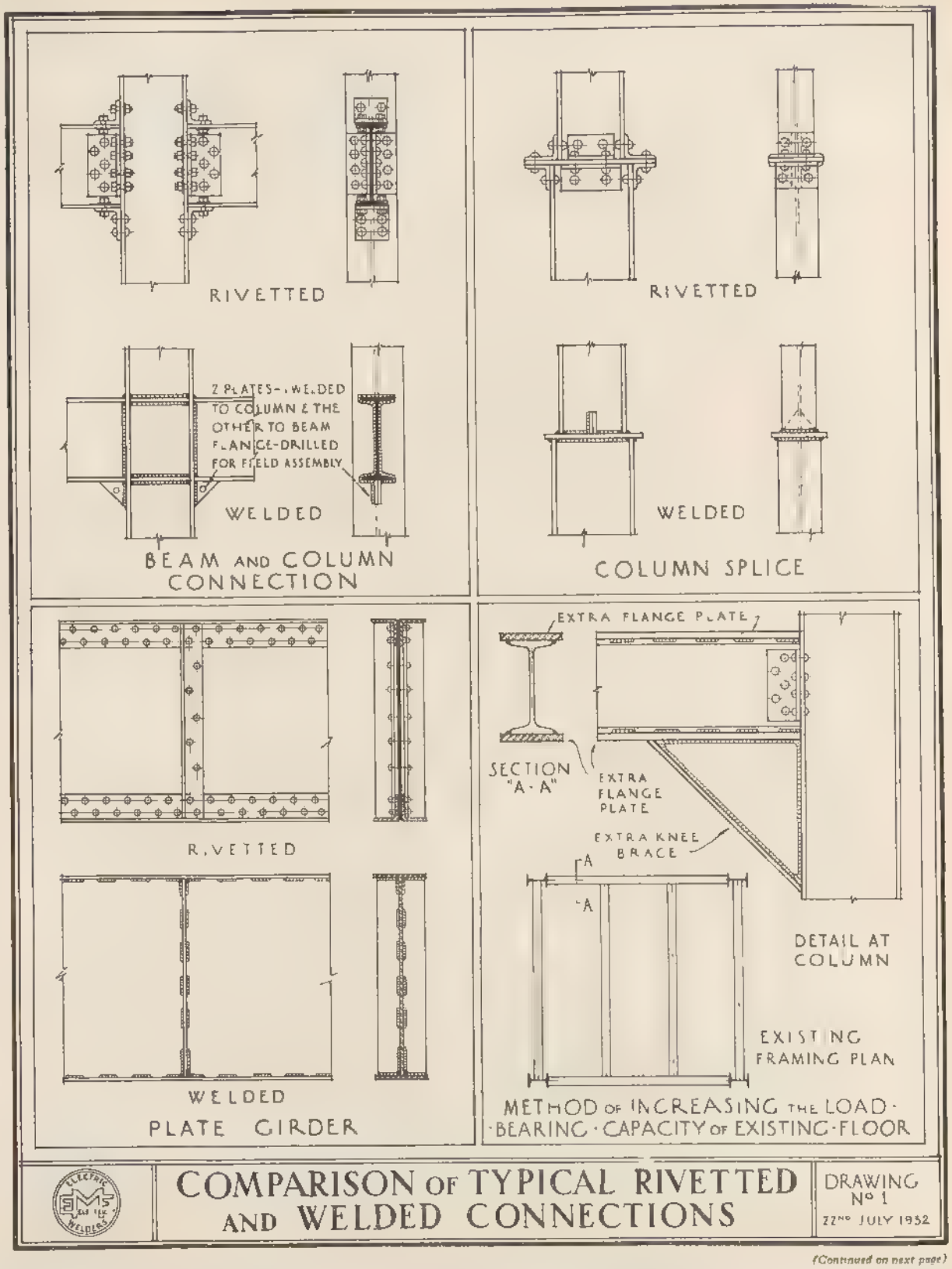

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The main advantages of arc welded steelwork are.—Lower first cost; greater aesthetic possibilities; greater facility for removal and remodelling; noiselessness of construction; and greater rigidity

With regard to cost, the price per ton for welded work is generally equal or slightly less per ton than for the riveted work. In properly designed structures, the saving in weight is at least 10 to 15 per cent., and frequently greater if suitable steel sections are obtainable

With regard to aesthetic possibilities, little work can as yet be quoted, but the absence of gussets, the facility for fabricating with flush surfaces, the possibility of welding members on edge and on end, and of adding ornamentation as required, justifies further work in this direction. There is already a development in America of the use of rust-resisting steel plating, comparatively easy to fix by welding, as an external finish for buildings. Pressed steel sheeting may be a possibility, and if needing painting, is no worse in that regard than many treatments now in vogue.

Remodelling and strengthening by welding, already used largely in some 76 railway and road bridges, including Echuca Bridge, Princes Bridge, Hawthorn and Victoria Street Bridges, are now receiving consideration for building alterations.

The comparative silence of the method as compared with riveting is a matter of importance in city work

Greater rigidity is frequently of importance, and there has been an extensive use of the method in the earthquake region of New Zealand.

The development of wrought metal work in railings, windows, doors, etc., and the considerable saving in the cost of this class of work effected by welding, is common knowledge, and hardly needs enlarging upon

In conclusion, an appeal is made for the development of this new form of construction, welded steel work, on lines which are not merely an imitation of the results obtained with other materials, but which are, if possible, the development of new styles altogether.

Government Wool Stores at Napier, N.Z., erected during reconstruction after the 1931 Earthquake.

DRAFT SPECIFICATION FOR ARC-WELDED STEELWORK

(1) SUPERVISION.

The whole of the metallic arc welding in this Contract shall be carried out under the immediate and continuous supervision of a person who has had at least five years' practical experience in the actual execution of this form of construction. The contractor shall furnish written proof of such person's experience to the satisfaction of the supervising engineer.

(2) ELECTRODES.

The whole of the welding shall be carried out with E.M.F. New Era Electrodes.

(3) TYPES AND SIZES OF WELDS.

BUTT WELDS. (a) The edges of a plate joined with a butt weld shall be bevelled and the included angle shall be not less than 70 degrees for a single V or double V-weld

(b) For plates less than ½ inch the plates may be bevelled from one side only to give a single V-weld.

(c) For plates ½ inch and over the plates shall preferably be bevelled from both sides to give a double V weld.

FILLET WELDS. A fillet weld shall be nominally 45 degrees mitre fillet.

The shape of the weld shall be slightly convex. The throat thickness shall be not less than 0.7 of the nominal size of the weld. The surface in contact shall not be less than 0.8 of the nominal size of the weld

GAUGE OF ELECTRODE AND LIMITING THICKNESS OF PLATES OR SECTIONS.

The maximum gauge of electrode shall be limited by the thickness of plates of sections as follows:—

GAUGE	Minimum Thickness of Plates	
	Butt Welds	Fillet Welds
10	3-16 in.	¼ in
8	⅜ in.	⅜ in
6	½ in.	½ in

SIZE OF RUNS.—The maximum and minimum amount of metal deposited in one run shall be as follows:—

GAUGE.	Sectional Area of Separate Runs Sq. Ins.		Length of Weld in Inches per Electrode.	
	Maximum	Minimum	Minimum	Maximum
10	0.34	0.17	5	9
8	0.43	0.27	6	10
6	0.51	0.29	8	14

WORKMANSHIP

The following details as to workmanship shall be observed.

PREPARATION. (a) Clean Sections. Plates and sections shall be free from oil, paint, heavy scale or any substance which might affect the quality of the weld Where a weld is to be deposited on any oxy-cut surface, the oxide shall be removed by chipping or abrasion until a bright, clean surface is exposed.

(b) Holding the Work. The landing edges of plate, sections to be welded shall be closed by service bolting, cramping, jigs or tack welds. When the work is liable to distortion during welding, it shall be held in approved frames or jigs.

(c) Distortion. Wherever possible the welding shall be carried out in a manner to minimise distortion and contraction stresses by applying the welding in intermittent stretches and by backstep welding, i.e., welding from the outside edge or end towards the centre, or by other means

(d) Slag All slag shall be removed from the weld, and the weld thoroughly cleaned before a run of welding may be superimposed on a previous run

STANDARD OF WORKMANSHIP.

(a) The welding shall be deposited in runs of good clean metal free from slag inclusions and porosity Tamping or hammering of the metal is prohibited, but the slag may be chipped from the metal with a light hammer.

(b) The weld shall show a good even contour, and on a cut specimen shall indicate good fusion with the parent metal. Slag inclusions or welds showing porosity shall be cut out and re-welded. The weld shall be free from undercutting. If the weld metal tends to fold over on the parent metal without proper penetration it shall be cut out and re-welded

CURRENT

(a) The current used shall be as required to carry out the welding as specified and shall be varied as required to meet the varying conditions, but generally shall be not more than 20 per cent. over nor more than 10 per cent. under the current specified by the manufacturer of the electrodes.

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13c

S.A.A. File No.

EDWARD CAMPBELL & SON PTY. LTD.

Steel Constructional Engineers

Office:
114-120 VICTORIA STREET, CARLTON, VIC.

Works:
42 FRANKLIN STREET, MELBOURNE

Telephones:
Office — F 1127
F 1128
Works — F 2916

Products

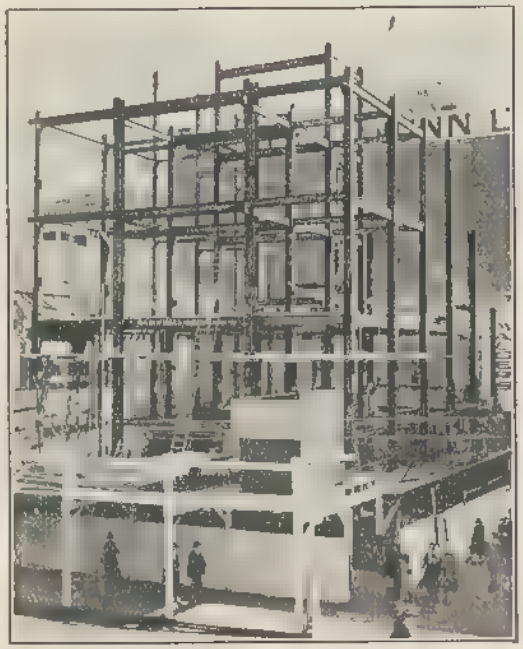
Steel-frame buildings, bridges, girders, stanchions, roofs, tanks and stands, hoppers, conveyors, cranes and gantries, runways, steel fire-escape stairways, verandahs, electric roof-signs, in fact, every kind of fabricated structural steelwork

Plant

The structural steel plant of Edward Campbell & Son Pty. Ltd., located at Franklin Street, Melbourne, comprises machines capable of turning out high-class work, stockyards carrying a large variety of sections, and an erecting shop, the whole being equipped with overhead electric travelling cranes

The plant has a central location, thus facilitating rapid delivery to any part of the Commonwealth. Sections carried in stock include British and Australian Standard Rolled Steel Joists, Channels, Equal and Unequal Angles, Tees, Flats and Plates, Chequer Plates and Bars.

Complete gear for erecting structural work is always available, and Edward Campbell & Son Pty. Ltd. are prepared to submit proposals, and prices for this type of work.



English, Scottish & Australian Bank Ltd., Swanston Street, Melbourne.
Architects Henry Hare & Hare

Riveted Construction

For important heavy structural steelwork the riveted joint is at present unrivalled for safety, due partly to the fact that the joint can be satisfactorily inspected and guaranteed to be, within reasonable limits, as strong as the designer proposed. In addition, locked-up or residual stresses of indeterminate value due to high temperatures will not be present in the completed structure.

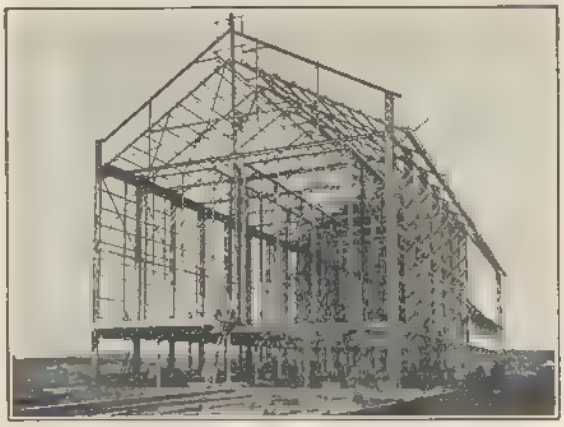
Welded Construction

For certain classes of light structural work as, for instance, light steel-framed buildings, welded construction makes a very economical and strong structure. Welding allows great flexibility in the design of steel buildings and so permits a structure more suited to its particular purpose than would be the case with other methods of construction.

Edward Campbell & Son Pty. Ltd are equipped to undertake this class of work, and will give clients the benefit of their past experience of this type of construction.

Services of Designers and Estimators

In their offices at Victoria St., Melbourne, adjacent to the works, Edward Campbell & Son Pty. Ltd. maintain a staff of experienced designers and estimators who are at all times ready to give fast and reliable service in the preparation of preliminary estimates, or to tender on architects' and engineers' own designs.



Chemical Works Geraldton, W.A.
Riveted Construction.

Erecting Hangar, Laverton, Victoria.
Electrically Welded Construction

(Continued on next page)

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Delivery and Erection

Edward Campbell & Son Pty. Ltd. will take care of delivery to any part of Australia and will erect their own structural steelwork if desired

Advantages of Steel Construction

The advantages of steel as compared with other types of construction are as follows: -

Steel is always thoroughly tested before being used in the structure, and is manufactured under very rigid control. It can therefore be relied upon to carry the loads assigned to it.

The stresses in a steel structure can be calculated with more precision than in any other type of construction, so allowing of a more economical design

Steel construction allows a great latitude for designs to suit various processes and purposes.

The actual setting out and fabrication of the structure is done in the works, where the proper tools and machines are available for handling the work. Under these conditions, the structure can be built to plans and specifications more accurately than when the whole of the construction is carried out at the site, where it is subject to interference from weather, traffic and various local conditions. A steel structure can be taken down, altered, transported to a new location and re-erected to suit alterations in procedure, re-organisation, etc., and can have the load for which it was designed applied immediately after the completion of construction.

Cantilever Verandahs

Notes from City of Melbourne Building By-laws.

Minimum live loads for Roofs to Cantilever Verandahs—30 lb. per sq. ft.

Framing of Steel throughout, except ceiling battens.

Ceiling of approved Stamped Metal, on 2 x 1 in redwood battens.

Fall of ¼ in. per foot toward building in roof.

Soffit to be horizontal

Fascia must have an overall finished depth of 18 in. for 10 ft. footpaths, 21 in. for 12 ft., and 24 in. for 18 ft.

Height above Pavement.—For 18 ft. footpaths, 12 ft.; for lesser widths, 11 ft., where adjacent to existing verandahs, to approval of Surveyor.

Steps.—If the fall is flatter than 1 in 30, steps shall not exceed 12 in. without special permission.

Roofing of 24-gauge Galvanized Corrugated Iron, clipped or bolted to purlins, lapped two corrugations at sides and 9 in. minimum at ends, riveted every 12 in. at sides and every third corrugation at ends.

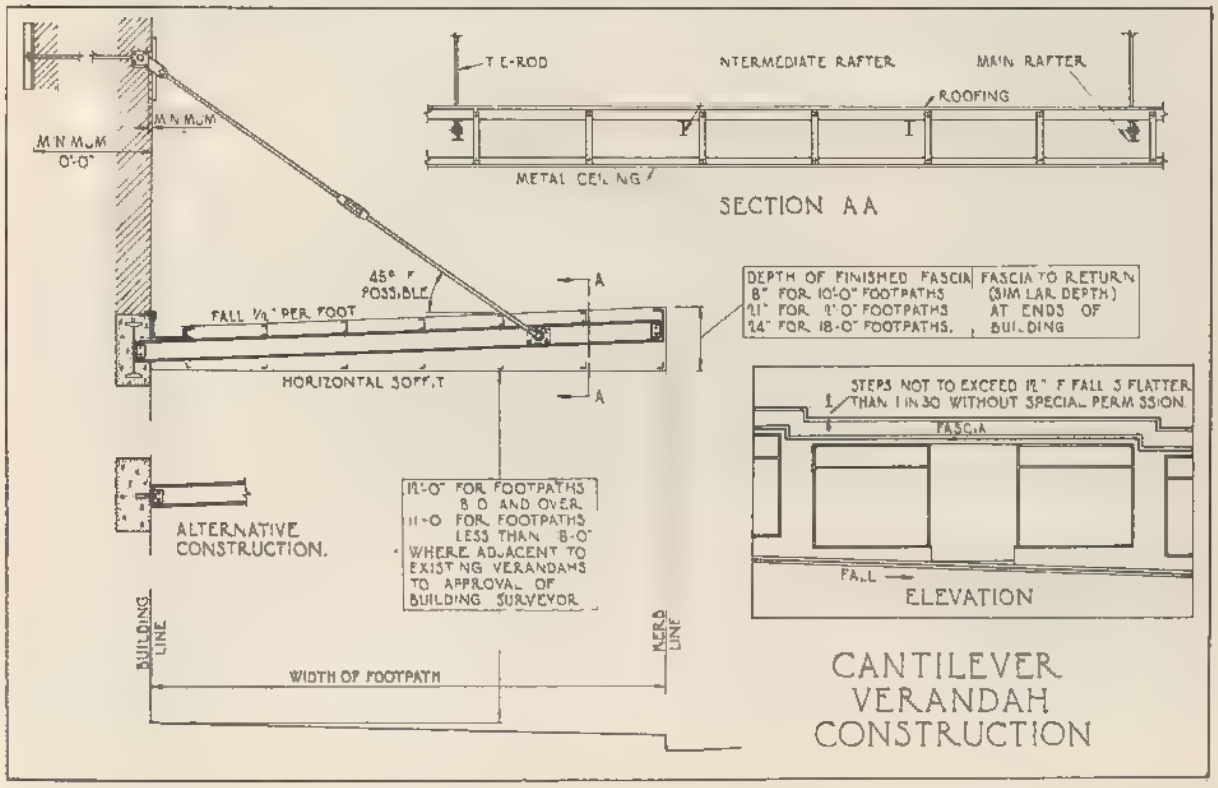
Box Gutters at or near the building line of 20-gauge galvanized iron, well lapped, riveted and soldered at ends of each sheet and supported on metal straps. (Steel straps at 2ft 6in. centres.)

See Building Surveyor re conforming to adjacent verandahs.

REPRESENTATIVE WORK

E.S. & A. Bank, Swanston Street, Melbourne.
Majorca House, Melbourne.
T. & G. Building, Sydney.
Chemical Works at Guildford, Bunbury, Geraldton, W.A.
Hangars at Laverton, Victoria.
Melbourne Harbour Trust Cargo and Passenger Sheds, Vict.
Burdekin Bridge, Queensland
Bridge over Merri Creek, Victoria.
Gasworks at Highett, Victoria; Launceston Tasmania, etc
Eastern Market, Carlyon's, and other verandahs.

DESIGN OF CANTILEVER VERANDAHS (CITY OF MELBOURNE)



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13 S.A.A. File No.	JOHNS & WAYGOOD LTD. *Engineers* CITY ROAD, SOUTH MELBOURNE *Telephones:* OFFICE & WORKS: M1241 (6 Lines)	STRUCTURAL STEEL- WORK

[For Other Products, See Index]

Products

Structural Steelwork either riveted, bolted or electrically welded for the framing of Office Buildings, Factory Buildings, Mill Buildings, Warehouses and Power Houses—Plate and Lattice Girders for Bridges, etc. Roof Trusses, Street Verandahs, Wireless Masts, Transmission Line Towers, Storage Tanks, Grain Silos, Coal Bunkers, Chimney Stacks and Flues, Crane Gantries, Telfer and Conveyor Structures, Hand or Power operated Travelling Cranes and Monorail Runways complete with switches, trollies and lifting blocks

Stock

We carry large stocks of steel beams, channels, angles, tees, plates and bars, and are therefore able to eliminate irritating and costly delays in the fulfilment of your orders.

Equipment

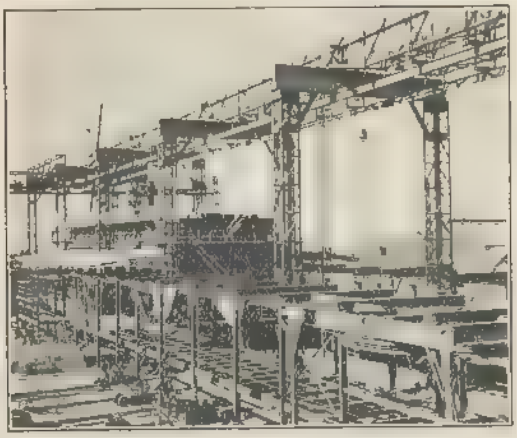
Our shop is equipped with an up-to-date plant specially designed to ensure the accurate fabrication and economical handling of riveted and electrically welded steel structures of all kinds.

Coal Store for the Metropolitan Gas Co.

Field Work

Our well - equipped gangs of erectors, in charge of experienced foremen, are available for the erection, alteration or demolition of all classes of structural steelwork in any part of the Commonwealth.

180 ft. Wireless Mast at Corowa, N.S.W.



B.H.P. Assoc. Smelters—Telfer Structure, at Port Pirie, S.A. Fyvie & Stewart, Consulting Engineers.

Service

Our technical staff is at the service of all who are interested in the erection of any of the above-mentioned structures, or of steelwork of a similar character, and will deal promptly with enquiries for preliminary estimates and/or firm quotations for the supply, delivery and erection thereof

Representative Structures in Which We Supplied the Steelwork

- Manchester Unity Building, Collins & Swanston Sts.
- A.M.P. Building, Collins St.
- Howey Court, Collins St.
- S.E.C.V. Building, Flinders St.
- Hotel Alexander, Spencer St.
- Herald Office, cr. Russell & Flinders St.
- Commonwealth Bank Sydney (Head Office).
- Myer's Warehouses, Bourke & Lonsdale Sts.
- Ford Works, Geelong.
- Newport B Power House.
- Briquetting Boiler House, Yallourn.
- Hydro-Electric Power House, Waddamana, Tasmania.
- Australian Ore & Metal Coy's. Power House, Broken Hill.
- Grandstands at Flemington Caulfield, and the Melbourne Cricket Ground
- Towers for Transmission lines linking up Yallourn with Richmond; Waddamana with Hobart and Launceston; and several of the mines at Broken Hill.

(Continued on next page)

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General Information Regarding Steel Beams and Notes from the M.C.C. Building By-laws

Steel Beams

Depth. In order to avoid an undesirable amount of deflection the span should not, in ordinary cases, exceed 24 times the depth of the beam. Figures to the left of the Zig-Zag line on the Beam Table fulfil this condition.

Lateral Support. As the proportion of the tabular load that should be carried by a beam without lateral support is dependent upon the nature of the load and the width of the beam flange, the table hereunder will be useful in determining the safe load on beams of various flange widths.

Lateral support is supplied when: Steel or timber beams are framed into the one under consideration: when two or more beams are bolted side by side, or when beams are wired round and concreted.

Span of Beam	Dynamic Load	Static Load
10 Flange widths	90% Tab.	—
20 "	80% "	Full Tab.
30 "	70% "	90% "
40 "	60% "	80% "
50 "	50% "	70% "

Fireproofing Steel

All steelwork carrying walls, floors or roofs of fire-resisting material to be wrapped with No 8 gauge wire at 2½ in. pitch and encased in concrete, allowing a cover of 2 in. for beams and 3 in. for columns.

Cantilever Verandahs

Structural framing to be of steel throughout.

Roofing 24 gauge G.C.I. clipped or bolted to purlins, lapped 2 corrugations at sides and 9 in. at ends, riveted at 12 in. centres at sides and every third corrugation at ends.

Roof Slope.—¼ in. per foot toward building.

Gutters.—20 gauge gal. iron of box section carried on steel straps at 2 ft. 6in centres.

Ceiling and Fascias of approved stamped metal secured to 2 in. x 1 in. redwood battens. The ceiling must be horizontal and beams must not project below ceiling line. Fascias must return at each end of verandah.

A.M.P. Building, Melbourne, Steel Frame Construction throughout. Sydney Smith, Ogg & Serpell, architects.

Stepping. — When grade of street is less than 1 in 30 steps must not exceed 12 in.

See Building Surveyor re conforming to design of existing adjacent verandahs

GENERAL DIMENSIONS

Width of Footpath	Finished depth of Fascia.	Ceiling Height
18 ft. 0 in.	24 in.	12 ft. 0 in.
12 ft. 0 in.	21 in.	11 ft. 0 in.
9 ft. 0 in.	18 in.	11 ft. 0 in.

Heights are measured on building line at the centre of building.

Dead Loads

Brickwork . . . 10 lbs. per sq. ft. per in. of thickness
Concrete, plain . 140 lbs. per cu. ft.
Concrete, reinforced . . . . 150 " "
Architectural Terra Cotta . 70 " "

Maximum Bearing Pressures of Soils, Etc.

Firm Clay or firm Dry Sand	4 tons per sq. foot
Hard Clay or Compact Sand	4 " "
Sound Shale Rock	15 " "
Hard Shale Rock	20 " "
Brickwork in Lime Mortar	8 " "
Brickwork in Cement Mortar	15 " "
Plain Concrete	12 " "
Reinforced Concrete, 1:2:4 mix. ..	30 " "
Basalt and Granite Masonry	22 " "

Minimum Loads for Floors, Etc.

Dwelling and Lodging Houses, Hotels, etc.	70	lbs. per sq foot
Assembly Halls, Retail and Workshops, Garages	140	" "
Office Buildings . ..	84	" "
Barrooms in Hotels and Stairways	112	" "
Warehouse Class Bldgs. (minimum)	168	" "
Flat Roofs to Buildings	70	" "
Flat Roofs to Cantilever Verandahs	30	" "
Pitched Roofs, 25 degrees slope* ..	22	" "
Pitched Roof, 35 degrees slope* ..	24	" "

*Based on horizontal area.

SAFE LOAD IN TONS ON OREGON PINE POSTS.

Length in feet	SECTION IN INCHES 3 x 3	4 x 4	5 x 5	6 x 6	7 x 7	8 x 8	9 x 9	10 x 10	11 x 11	12 x 12
10	1.34	3.57	6.70	10.7	15.6	21.4	28.1	35.7	44.1	63.5
12	—	2.86	5.80	9.65	14.4	20.0	26.5	33.9	42.2	51.4
14	—	2.14	4.91	8.56	13.1	18.5	24.9	32.1	40.3	49.3
16	—	—	4.02	7.50	11.9	17.1	23.3	30.4	38.3	47.1
18			3.12	6.43	10.6	15.7	21.7	28.6	36.4	45.0
20			-	5.35	9.39	14.3	20.1	26.8	34.4	42.9

Working Stress

$$= 1{,}000 \left(1 - \frac{L}{60d}\right)$$

lbs. per sq. in. Ends fixed.

Safe Distributed Loads (in tons of 2,240 lbs.) on Oregon Pine Beams. (Fibre Stress 1,200 lbs. per sq. in.) Note:—For hardwood beams multiply tabular loads by 1⅓.

Span in Feet	SECTION IN INCHES 6 x 2	6 x 3	7 x 2	7 x 3	8 x 2	8 x 3	8 x 4	9 x 4	9 x 3	10 x 4	10 x 3	11 x 4	12 x 3	12 x 4
8	.73	.91	.73	1.1	.75	1.4	1.8	2.4	2.2	1.6	2.7	3.0	3.2	4.3
10	.43	.64	.58	.88	.76	1.1	1.5	1.9	1.8	2.4	2.2	2.9	2.6	3.4
12	.36	.54	.48	.73	.63	.95	1.2	1.6	1.5	2.0	1.8	2.4	2.1	2.9
14	.31	.46	.42	.63	.54	.81	1.0	1.4	1.3	1.7	1.6	2.0	1.8	2.5
16	.27	.40	.36	.55	.47	.71	.91	1.2	1.1	1.5	1.4	1.8	1.6	2.2
18	—	—	.32	.49	.42	.63	.81	1.1	1.0	1.3	1.2	1.6	1.4	1.9
20	—	—	—	—	.38	.57	.72	.96	.89	1.2	1.1	1.4	1.3	1.7
22	—	-	—	—	.35	.52	.66	.88	.81	1.1	.98	1.3	1.2	1.6

(Continued on next page)

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

SAFE DISTRIBUTED LOADS [IN TONS OF 2240 LBS.] ON ROLLED STEEL BEAMS

SECTION

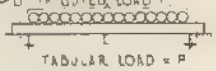
SPAN IN FEET	14 x 7¾ x 100 LBS.	14 x 7¾ x 90 LBS.	12 x 7 x 75 LBS.	10 x 6¾ x 65 LBS.	18 x 7 x 75 LBS.	18 x 6 x 55 LBS.	16 x 6 x 50 LBS.	15 x 6 x 45 LBS.	15 x 5 x 42 LBS.	14 x 5¾ x 40 LBS.	13 x 5 x 35 LBS.	11 x 6 x 65 LBS.	12 x 6 x 44 LBS.	12 x 5 x 30 LBS.	10 x 8 x 70 LBS.	10 x 8 x 55 LBS.	10 x 6 x 40 LBS.	10 x 5 x 30 LBS.	10 x 4½ x 25 LBS.	9 x 7 x 50 LBS.	9 x 4 x 21 LBS.	8 x 6 x 35 LBS.	8 x 5 x 28 LBS.	8 x 4 x 18 LBS.	7 x 3½ x 15 LBS.	6 x 5 x 25 LBS.	6 x 4½ x 20 LBS.	6 x 3 x 12 LBS.	5 x 4½ x 10 LBS.	5 x 3 x 11 LBS.	5 x 2½ x 9 LBS.	4¾ x 1¾ x 6.5 LBS.	4 x 3 x 10 LBS.	4 x 2½ x 5 LBS.	3 x 1½ x 5.75 LBS.
4																					14			8	16	10	5	9.3	3	7.3	5.8	3.8	5.9	1.4	1.1
6									51	48	39		47	3.	6		36	26	21		6	15	20	12	9.1	3	0	6.1	8.9	4.8	3.9	2.5	3.5	6	5
8			10	81	85	61	51	44	38	36	29		35	23	46	58	27	19	16	31	2	.9	15	9.3	6.8	10	7.7	4.7	6.1	3.6	2.9	1.9	2.6	1.1	..
10	8	108	8.	95	68	50	4	35	30	29	23	45	28	18	37	31	22	5	3	25	.9.6	5	2	7.4	5.5	8	6.	3.7	5.3	2.9	2.3	1.5	2.1	98	
12	98	90	68	54	57	41	34	29	25	24	19	36	23	5	31	26	8	.3	1	2	8	13	9.9	6.2	4.6	6.7	5.1	3	4.4	2.4	9				
14	84	78	58	47	49	36	29	25	22	20	17	3	20	.3	26	22	16		9.3	18	6.9	11	8.5	5.3	3.9	5.7	4.4	2.7							
16	74	68	51	4	42	3.	26	22	.9	.8	14	27	7	.2	23	9	14	9.7	8.2	5	6	9.6	7.4	4.6	3.4	5	3.8	2.3							
18	65	60	45	36	38	28	23	19	17	6	.3	24	.6	20	20	.7	2	8.6	7.2	4	5.3	8.5	6.6	4	3										
20	59	54	41	33	34	25	21	7	5	14	.2	22	14	9.2	.8	15	1	7.8	6.5	12	4.8	7.7	5.9	3.7											
22	54	49	37	30	3	23	9	6	14	13	.	20	13	8.4	7	4	9.9	7	5.9		4.4														
24	49	45	34	27	28	21	.7	5	.3	12	9.7	18	12	7.7	15	3	9.1	6.5	5.4																
26	45	42	3	25	26	.9	6	3	2	11	8.9	.7	.	7																					
28	42	39	29	23	24	.8	5	2	1	10	8.3	5	10	6.6																					
30	39	36	27	22	23	.7	4	2	0	9.6	7.7	.4	9.3	6.1																					
32	37	34	25	20	2	.6	3	..	9.5	9	7.3																								
34	35	32	24	.9	20	5	12	10	9	8.4																									
36	33	30	23	8	9	.4	1	9.7	8.5																										
38	31	29	21	17	8	13	1																												
40	29	27	20	5	.7	12	10																												

TABULAR LOADS FOR VARIOUS CONDITIONS OF LOADING

IN EACH CASE L = SPAN IN FEET

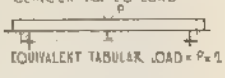
FACTOR OF SAFETY = 4
WORKING FIBRE STRESS = 8 TONS/□"

① BEAM WITH A UNIFORMLY DISTRIBUTED LOAD P.



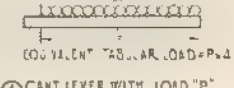
TABULAR LOAD = P

② BEAM WITH A CENTRALLY CONCENTRATED LOAD



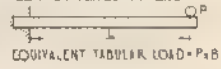
EQUIVALENT TABULAR LOAD = P × 2

③ CANTILEVER WITH A UNIFORMLY DISTRIBUTED LOAD P



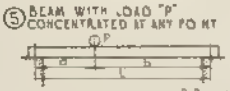
EQUIVALENT TABULAR LOAD = P × 4

④ CANTILEVER WITH LOAD "P" CONCENTRATED AT END.



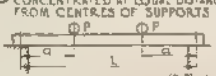
EQUIVALENT TABULAR LOAD = P × 8

⑤ BEAM WITH LOAD "P" CONCENTRATED AT ANY POINT



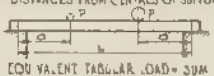
EQUIVALENT TABULAR LOAD = $\frac{P \times b \times a \times 4}{L}$

⑥ BEAM WITH 2 EQUAL LOADS P CONCENTRATED AT EQUAL DISTANCES FROM CENTRES OF SUPPORTS



EQUIVALENT TABULAR LOAD = $\frac{(P \times P) \times 4 \times a}{L}$

⑦ BEAM WITH 2 UNEQUAL LOADS P & P1 CONCENTRATED AT EQUAL DISTANCES FROM CENTRES OF SUPPORTS



EQUIVALENT TABULAR LOAD = SUM OF LOADS OBTAINED FROM CASE 6 FOR BALANCED PORTION OF LOADS AND CASE 5 FOR REMAINING PORTION OF LARGER LOAD

IN ORDER TO AVOID AN UNDESIRABLE AMOUNT OF DEFLECTION VALUES OF TABULAR LOAD SHOULD LIE ABOVE HEAVY ZIG-ZAG LINE

SAFE CONCENTRIC LOADS [IN TONS OF 2240 LBS.] ON ROLLED STEEL BEAMS USED AS COLUMNS

SECTION

LENGTH IN FEET	14 x 7¾ x 100 LBS.	14 x 7¾ x 90 LBS.	12 x 7 x 75 LBS.	10 x 6¾ x 65 LBS.	10 x 6¾ x 65 LBS.	18 x 7 x 75 LBS.	18 x 6 x 55 LBS.	16 x 6 x 50 LBS.	15 x 6 x 45 LBS.	15 x 5 x 42 LBS.	14 x 5¾ x 40 LBS.	13 x 5 x 35 LBS.	12 x 8 x 65 LBS.	12 x 6 x 44 LBS.	12 x 5 x 30 LBS.	10 x 8 x 70 LBS.	10 x 8 x 55 LBS.	10 x 6 x 40 LBS.	10 x 5 x 30 LBS.	10 x 4½ x 25 LBS.	9 x 7 x 50 LBS.	9 x 4 x 21 LBS.	8 x 6 x 35 LBS.	8 x 5 x 28 LBS.	8 x 4 x 18 LBS.	7 x 3½ x 15 LBS.	6 x 5 x 25 LBS.	6 x 4½ x 20 LBS.	6 x 3 x 12 LBS.	5 x 4½ x 10 LBS.	5 x 3 x 11 LBS.	4 x 3 x 10 LBS.
6																			41	34		17		40	23	8	36	27	13	28	19	1	
8	124	30	104	29	89	07	73	67	60	50	5	43	99	60	36	07	84	56	37	29	14	22	49	36	19	14	33	23	9.8	25	9.4	8.6	
10	132	19	95	9	80	98	65	60	54	42	45	37	93	55	3	100	79	5	32	24	69	18	45	31	5		29	20		22			
12	110	09	85	09	72	89	57	53	47	35	39	31	87	49	26	94	74	45	27	20	64		40	27			25	16		18			
14	109	99	75	99	63	80	49	46	41		32		81	43		87	68	40	22		58		36	23			21			5			
16	98	88	66	89	54	7.	4	39	34				75	37		81	63	35			53		31										
18	86	77	56	79		61							68			74	58	30			48		27										
20	74	67		68									62			68	51				42												
22													56			61	47				37												
24													50			54	42																

THESE LOADS CONFORM TO THE MELBOURNE CITY COUNCIL'S REQUIREMENTS FOR COLUMNS WITH FIXED ENDS

TO ESTIMATE BENDING COLUMN LOADS SHOULD BE BALANCED LOADS ARE NOT BALANCED THE APPROXIMATE EQUIVALENT CONCENTRIC LOAD CAN BE FOUND BY ADDING 1/3 THE UNBALANCED PORTION OF WEB LOAD AND 2/3 TIMES THE UNBALANCED PORTION OF FLANGE LOAD TO THE TOTAL LOAD ON THE COLUMN

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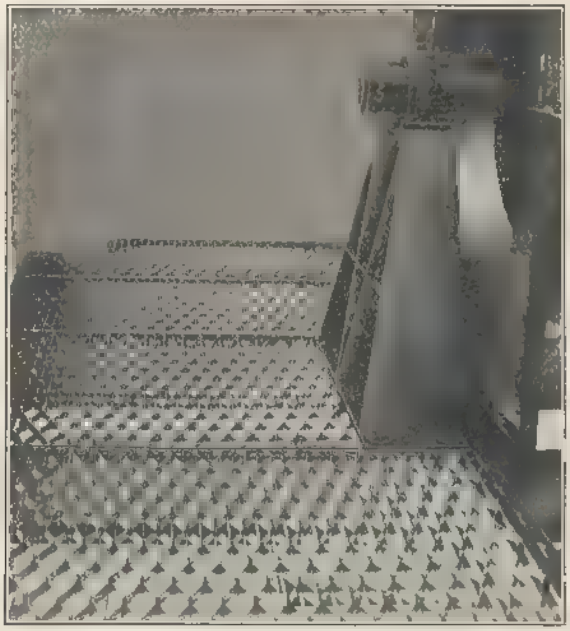
DIAMOND GRID FLOORING



Fan Platform Supplied and Fitted to No 2 Boiler House, Yallourn to the Order of the State Electricity Commission of Victoria

A. CHALLINGSWORTH PTY. LTD.

ESTABLISHED 1880

STRUCTURAL ENGINEERS 476 SWAN ST RICHMOND E 1, VICTORIA

(Continued on next page)

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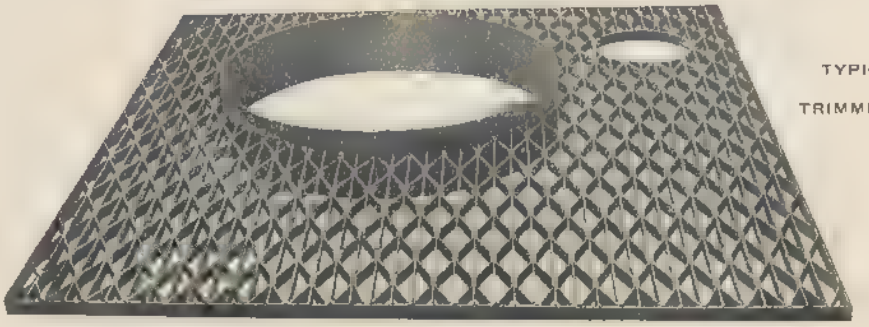
DIAMOND GRID FLOORS



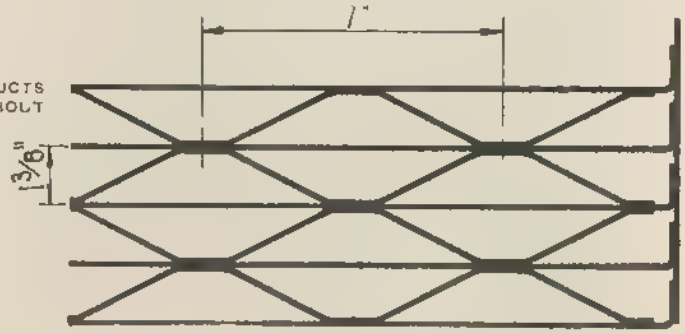
TYPICAL PANEL WITH TRIMMED OPENINGS

CONSTRUCTIONAL FEATURES

1. Diamond Grid Flooring is comfortable to walk on, and loaded trucks, wheelbarrows, barrels, etc., may be wheeled or rolled over its surface with ease and safety.
2. It is structurally strong and light in weight (see below).
3. It does not harbour dust and dirt.
4. It admits light and air to the area below to the extent of 84 per cent. of its total surface
5. It provides good visibility and facilitates communication between operators on different levels
6. It is easily laid, easily lifted and easily adapted to subsequent alterations in lay-out.
7. It may be supplied in any desired colour, stove enamelled and complete with all fastenings for securing in place.
8. Irregularly shaped panels may be supplied to suit special requirements.
9. No drilling is required to supporting structure for securing grids.
10. Trimmed openings may be provided to accommodate pipes, ventilators, control rods, etc., as required.

PARTICULARS OF FOUR PRINCIPAL SIZES OF DIAMOND GRID FLOORING

DIAMOND GRID PRODUCTS ARE WELDED THROUGHOUT



TYPE	SECTION	WEIGHT Per Sq. Ft Lbs.	Safe Distributed Load in Lbs. per Sq. Ft. at Varying Spans						
			2	2 6	3	3 6"	4	4'6"	5'
A	STRAIGHT BARS, 1" × 1/16" BENT BARS, 1" × 1/16"	4	500	335	225	150	105	85	70
B	STRAIGHT BARS, ¾" × ⅛" BENT BARS, ¾" × ⅛"	6	560	380	250	170	120	95	80
C	STRAIGHT BARS, 1" × ⅛" BENT BARS, 1" × ⅛"	8	1000	670	450	300	210	170	140
D	STRAIGHT BARS, 1¼" × ⅛" BENT BARS, 1" × ⅛"	9	1280	860	575	385	270	215	180

Spans to the right of heavy line are not recommended.
Sizes other than those specified above can be supplied by special arrangement.

(Continued on next page)

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DIAMOND GRID STEPS AND LADDER RUNGS

STAIR TREAD

LADDER RUNG

Stairway steps and ladder rungs, as illustrated above, can be supplied in any desired lengths.

A neatly-fitted nosing formed of half-round mild steel gives the finished stairway a pleasing finish

The ends are provided with strong plates of sufficient width to ensure a sound connection to the side strings.

Two holes are punched in each end plate so arranged that all steps and rungs are interchangeable.

All steps and rungs are supplied with a stove enamelled finish in any desired colour.

STRUCTURAL STEEL WORK

Viaduct over Maribyrnong River, Melbourne.
Length 1,257 ft., Maximum Height 180 ft.
(Towers Fabricated by A. Challingsworth Pty. Ltd.)

Messrs. A. Challingsworth Pty. Ltd. (established 1880) design, fabricate and erect all classes of structural steel, welded and riveted

Girders (all types) Cranes Roof Trusses Gas Holders
Silos Steel Buildings Chimney Stacks Tanks, etc.

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13c

S.A.A. File No.

GEO. W. KELLY & LEWIS PTY. LTD.

ENGINEERS

Office:
COLLINS HOUSE, 360 COLLINS STREET, MELBOURNE.

Works.
SPRINGVALE, VICTORIA.

Sole Representatives:
N.S.W.—Alfred Snashall Ltd. 85 Pitt Street, Sydney.
S.A.—E. Treliving, T.T. Buildings, Light Sq., Adelaide.
QUEENSLAND—Waugh & Josephson Ltd., 102-104 Melbourne St., South Brisbane.
W.A.—Atkins (W.A.) Ltd., 894 Hay Street, Perth.

K-L

[For Other Products, See Index]

Products

Steel-frame Buildings, Tanks, Girders, Bridgework and all Structural Engineering Work.

Plant

Geo. W. Kelly & Lewis Pty. Ltd. have at Springvale, Victoria, a structural steel plant capable of handling the largest and most complicated structural work. The whole of the plant is laid out in such a manner as to ensure economical handling of a large variety of work, being served throughout by overhead electric travelling cranes and equipped with machinery of the most modern type.

The plant has its own railway siding, which enables work to be despatched without rehandling, this being a very important factor to be considered when buying structural steelwork, as careless rehandling of some work may cause members to be strained out of their true position to such an extent that they require resetting

Range of Shapes

The stock-yards at Springvale carry a comprehensive stock of Australian and British standard sections of Joists, Channels, equal and unequal angles, and Tees. Also, large stocks of plates, both ship and boiler quality, flats and bars are carried.

Fabrication and Erection

Geo. W. Kelly & Lewis Pty. Ltd. are equipped and organised to fabricate and erect structural steelwork anywhere, and are prepared to estimate and advise on any work of this nature.

Quality of Steel

All structural steel used conforms to the Australian Standard Specification for Structural Steel

Architectural and Shop Drawings

A staff of experienced structural engineers and draughtsmen is maintained at the Springvale Works and these are always at the service of clients to prepare designs and complete shop working drawings from architect's drawings or proposals. Alternatively, shop drawings will be prepared from the architect's or engineer's own designs.

Engineering Service

In addition to preparing designs and shop drawings from architects' and engineers' proposals, the Geo. W. Kelly & Lewis staff of engineers are in a position to carry a construction programme right from the preliminary proposals and designs to the final completion of the job. By co-operation between mechanical and structural engineers, a large variety of work can be handled successfully.

LIST OF REPRESENTATIVE WORK.

New Turbine and Boiler House at Yallourn.
Spillway Gates for Hume Reservoir
Boiler Shops, Victorian Railways, Newport.
Cement Storage Shed, Mt. Lyell Chemical Fertilizers, North Fremantle, W.A.
Structural Steelwork for Spencer Street Bridge.
Structural Steelwork for Bridges over Maribyrnong and Murray Rivers.

Mechanical Erection Bays.

Note Steelwork Fabricated by Kelly & Lewis.

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WELDED STRUCTURES	GARDNER CONSTRUCTIONS PTY. LTD. OFFICES: CHANCERY HOUSE, 440 LITTLE COLLINS STREET, MELBOURNE FACTORY: WILLIAMSTOWN ROAD, PORT MELBOURNE	13c S.A.A. Fil. No.

Products

Medium and heavy structural work of all kinds, steel-framed buildings, roof trusses, bridges, storage tanks for oil, water or other liquids, elevated storage tanks, pipe lines, pipe specials, etc.

Design

We can quote either to architect's design or alternatively will submit designs to architect's requirements. Our designing staff is directed by highly qualified and experienced technical men. Our specialised knowledge of Structural Engineering is at the disposal of clients. As most of our structural work is electrically welded, it is in clients' interest to give us an opportunity for submitting designs that take full advantage of the economies offered by electric welding

Fabrication

Our workshops are under the direct supervision of technically trained men. Our plant is modern, and only efficient workmen are employed. Accuracy and a high standard of workmanship are maintained by rigid and critical supervision.

Electric Welding

Gardner Constructions are indisputably the leading Structural Welding Engineers in Australia. We are convinced that electric welding is better in every way than riveting. The recent falls in the costs of riveted structural steel are largely due to the efforts of structural firms to meet the lower costs of welded structures. Our workshop and supervision methods are such that the "human factor" is of less importance than in riveting. The design of electrically welded structures has now been developed to a rational scientific basis.

Field Work

Our organisation comprises erection gangs supervised by experienced foremen. We are pleased to quote for completely erected steel structures of any kind, in any part of Australia We have erected a large amount of work in practically every State in the Commonwealth. We claim that there are few firms in Australia so well equipped for construction work in distant locations.

BRIDGE OVER TAMBO RIVER, SWAN REACH.
Welded Plate Girders Fabricated and Erected by us to the design of Country Roads Board of Victoria.

GARDNER WELDED ROOF TRUSSES

Standard Roof Trusses

We have standard trusses to suit most requirements The spans range from 20 ft. to 60 ft., in multiples of 2 ft., but the trusses can readily be altered to suit any span

These trusses are economical in design and give a maximum strength for a minimum amount of material. They are designed to carry galvanized corrugated iron sheeting on either steel or timber purlins

The standard pitch of our trusses is 22½ deg.

Other Types

We design and fabrciate trusses to carry slate and tile covering or any special type of truss that may be required.

Truss Framing Details

The lighter type of trusses are supplied in one piece, while the larger types are supplied in convenient sections for transporting and are connected together in the field by means of bolts.

Truss sections may be welded together in the field in preference to bolting if desired.

(Continued on next page)

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

GRILL FLOORS

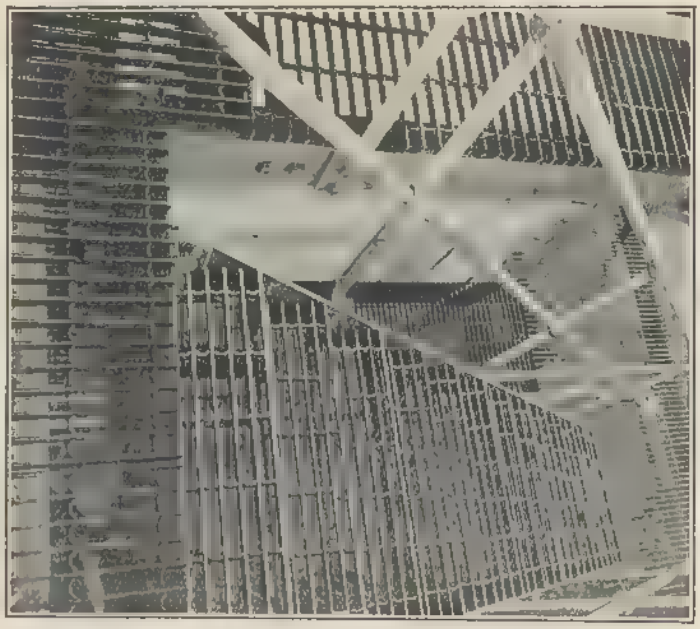
Gardner Constructions Pty. Ltd. have been appointed sole manufacturers in Australia by Messrs. Grill Floors Ltd., London. Our English principals have completed a large number of Grill Floor installations in Great Britain and abroad. Our clients, therefore, have the added assurance that the article has the approval of eminent members of the British Engineering and Architectural professions. All Grill Floors sold in Australia will be manufactured to English specifications in our Melbourne workshops

GRILL FLOORS consist of straight rolled steel bars interlaced with twisted steel members presenting a simple structure without rivets or bolts. The straight bars carry the load whilst the twisted bars brace the compression flange of the load carriers and project sufficiently to form a perfect NON-SKID surface in all directions.

GRILL FLOORS are provided with a definite means of attachment to supporting steelwork, need no frame or other special device for fixing, and can be supplied to fit any shaped area without sacrifice of strength.

GRILL FLOORS can be made of any strength, length or width, the most convenient sizes for handling, however, are tabulated herein.

GRILL FLOORS are cheaper than Chequer Plate, and infinitely better.



Typical Landings and Stairways made up of Grill Floor Units.

Special Advantages of Grill Floors

1. Non-slipping surface for all time Wear does not affect this quality.
2. Maximum strength with minimum weight. See Tables.
3. Maximum lighting and ventilation — more than 80 per cent. of the total area is open.
4. Self-cleaning. Dirt and foreign matter cannot collect on a Grill Floor.
5. Safety. The open spaces are so narrow that heavy articles cannot fall through.
6. Simple installation. Either bolts, clips, or hookbolts can be used for attaching the Grill Flooring to structures or alternatively tack-welding. Drilling of structures is not essential for fastening.
7. Unsymmetrical shapes and apertures for pipes or other fittings are easily provided at small cost.
8. Ease in Painting. The design permits of all surfaces being properly covered by a paint spray or brush.

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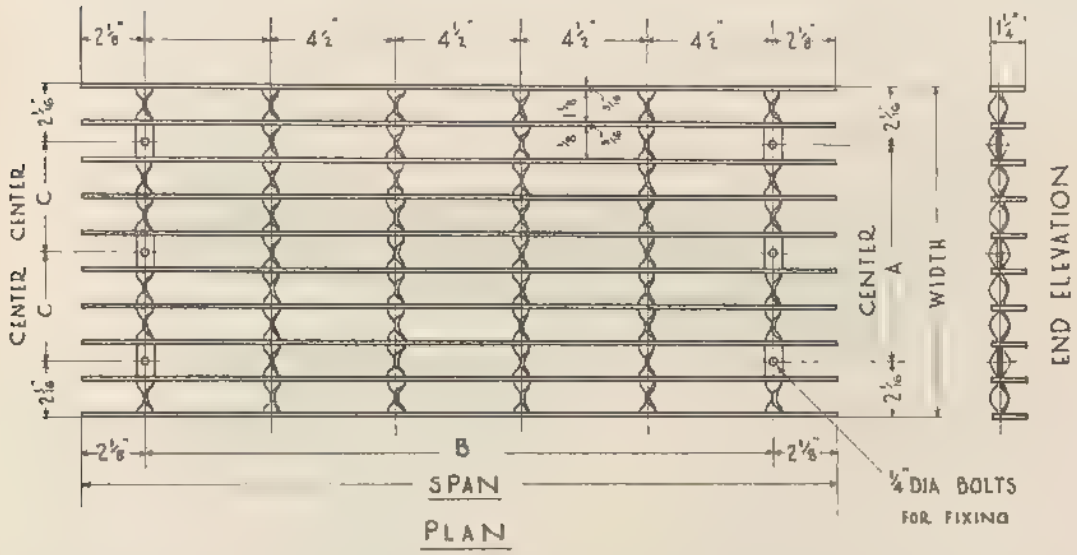
GRILL FLOORS

DESIGNING DATA

GENERAL DIMENSIONS OF FLOOR SLABS



Standard Width of Slabs

No Bars	10	11	12	13	14	15	16	17	18	19	20	
Width ..	1' 0"	1' 1 5/16"	1'2⅝"	1'3 11/16"	1'6½"	1'8 9/16"	1'7⅞"	1'9 3/16"	1'10½"	1'11 13/16"	2'1⅛"	etc.

Standard length.—Any multiple of 4½" added to 4½".
These dimensions can be altered to suit special cases.

Weights of Grill Flooring

Size in inches	⅝ x ⅛	1 x ⅛	1¼ x ⅛	1⅛ x ⅛	1 x 5/16	1¼ x 5/16	1⅛ x 3/16	1⅝ x 3/16	2 x 3/16	2¼ x 3/16
Weight in lbs. per sq. ft.	4	5	6	7	7	8	10½	12	13½	15½

Safe Loads in lbs. per square feet super

Size of Grill	Spans in feet 2	3	4	5	6	7	8
[illegible]	700	320	90	20			
[illegible]	1 00	480	280	2[illegible]	125		
[illegible]		500	295	190	35		
[illegible]		750	420	280	200	150	0
[illegible]			610	395	280	220	165
[illegible]			860	540	380	275	210
2 [illegible]			080	695	485	360	28[illegible]

Grill Stairtreads

Can be fitted to any form of staircase. They are light, strong and easily fixed, and are made to any span.

Grill Stairtreads are fixed to stringers by two bolts or rivets at each end, or welded.

No bearers, cleats or other form of supports required.

Standard Width Stairtreads: 3½", 5 1/16", 6⅝", 7 11/16", 9", 10 5/16".

Installation

If desired, we are in a position to design and quote for complete installations, including supporting steelwork, stairways, hand-railing, etc.

Our technical staff is available at all times to supply detailed information on Grill Floors.

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

NEW LIGHT WEIGHT STEEL JOISTS AND CHANNELS

General

These light-weight joists and channels are most economical for building purposes. They have a greater depth for their weight than ordinary rolled steel sections, which means no excess weight in the structure. In many cases they can be used to replace rolled sections of two to three times their weight, such as roof purlins, wall girts, lintols, stud partitions and floor joists

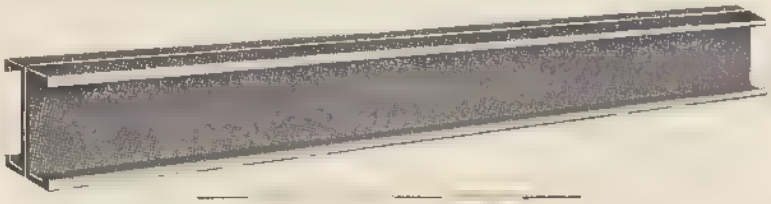
Fabrication

The sections are completely shop fabricated from mild steel ready to erect without any further work in the field Channel sections are made in one piece up to 10 ft. long Two channels machine welded together form a joist section. Longer lengths of either section are made by machine welding several lengths together.

Advantages

Light weight joists and channels are fire resisting They can be handled by one or two men and require even less labour to instal. The saving effected by using them as roof purlins or wall girts is enormous They will take the place of other sections two to three times their weight, thus reducing the total loads on the trusses and foundations. Also they are easily handled and quickly erected

When used as studs for partitions they can be specially prepared to take plaster sheets or metal laths for plastering. They make fire-resisting floor joists for dwellings or factories and can be floored with either concrete or timber and ceiled with plaster.



Sections and Properties of Standard Channels

Dep. D	Flange Dimensions B	Flange Dimensions A	Weight per ft. lbs.	Thickness of Metal ins	Area sq. ins.	Horizontal Axis 1 1 Moment of Inertia	Section Modulus	Radius of Gyration
4	1 1/8	3/8	2.18	.072	.576	1.3	65	1.552
5	1 1/8	3/8	2.45	.072	648	2.19	88	1.895
6	1 1/8	3/8	2.73	.072	.72	3.45	1.15	2.244
7	1 1/8	3/8	3.27	.072	86	5.6	1.6	2.629
8	2	3/8	3.98	.072	.972	8.4	2.1	3.055

Sections and Properties of Standard Joists

Dep. D	Flange Dimensions B	Flange Dimensions A	Weight per ft. lbs	Thickness of Web ins.	Area sq. ins.	Horizontal Axis 1 –1 Moment of Inertia	Section Modulus	Radius of Gyration
4	3	3/8	4.36	.144	1.[illegible]	[illegible]	1.3	1.522
5	3	3/8	4.9	.144	1.[illegible]	4.38	1.76	1.8[illegible]
6	3	3/8	5.46	.144	1.[illegible]	6.9	2.3	2.44
7	3 1/8	3/8	6.54	.144	.72	11.2	3.2	2.629
8	4	3/8	7.96	.144	[illegible]	16.8	4.2	3.055

STANDARD CHANNELS

Safe Load in Pounds Uniformly Distributed

Depth of Channel	Weight per Foot	SPAN IN FEET 8	9	10	11	12	13	14	15	16	17	18	19	20
4	2.18	860	770	690	630	575								
5	2.45	1175	1045	940	855	785	25	[illegible]	[illegible]	[illegible]				
6	2.73	1530	1360	1230	1110	1020	940	875	[illegible]	[illegible]	72	[illegible]	[illegible]	
7	3.27	2600	2370	2130	1940	1775	1640	1520	1420	[illegible]	1250	1180	1120	1060
8	3.98			2800	2540	2[illegible]	[illegible]	[illegible]	1840	1750	[illegible]	1550	1470	1400

STANDARD JOISTS

Safe Load in Pounds Uniformly Distributed

Depth of Joist	Weight per Foot	SPAN IN FEET 8	9	10	11	12	13	14	15	16	17	18	19	20
4	4.36	1720	1540	1380	1260	1150	1068	—	—	—		—		
5	4.9	2350	2090	1880	1710	1570	1450	[illegible]	1240	1164		—	—	
6	5.46	3050	2720	2440	2220	2040	1880	1750	1630	[illegible]	1440	1360	—	
7	6.54	5320	4740	4260	3880	3550	3280	3040	2840	2660	2500	2360	2240	[illegible]
8	7.96	—	—	5600	5080	4640	[illegible]	4000	3740	3500	3280	3100	2940	[illegible]

Loads are based on moment of $\frac{WL}{8}$ and extreme fibre stress not over 16,000 lbs. per square inch.

Loads to the left of the zig zag line will give deflection of less than $\frac{1}{360}$ of span. Loads to right of line are suitable for roof purlins, etc

All loads are based on joist receiving the usual side supports as in building work

(Continued on next page)

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LIGHT STRUCTURES

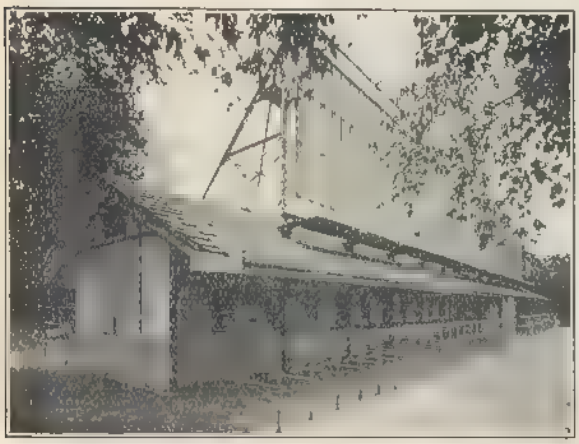
Products

Standard Unit Construction Buildings of all types, Sheds, Roof Trusses and anything constructed of light steel sections.

General Description

In introducing Standard Unit Construction buildings, we have aimed at bringing the benefits of mass construction within the reach of everyone At the same time beauty and individuality have been introduced into every building by varying the combination of a number of standard parts. Two of the latest developments in engineering science—arc and spot welding—are employed.

This method has revolutionised the production of this type of building, giving greater strength. Because of the large increase in the volume of its business, Gardner Constructions have been enabled in recent years to continually offer reduced prices



Totalizator Building Erected for V R C. on the Hill, Flemington Racecourse. Gardner Construction Patent Concrete Panels, Welded Steel Trusses and Super structure. Architects Robertson & Macks, Sydney, H. J Wagstaff, Melbourne

Interchangeable Units

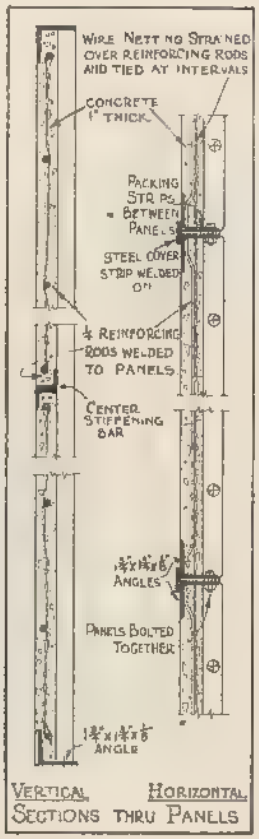
Each building consists of a number of interchangeable units. As the units are all made to jigs, assembly offers no difficulties. The wall units consist of panels constructed of angle iron electrically welded. When the units are bolted together they form the structural frame of the building The wall sheeting is fastened to the panels either by bolting and spot welding or with metal fillets. Roof trusses are all made to jig and connection to wall framework is simple and strong.

Concrete Panels

To meet a demand for a stronger and better looking panel Gardner Constructions Pty. Ltd. have perfected after many experiments and tests, a panel which is rapidly gaining a recognised place among architects and builders as a standard type of construction where strength and appearance are considerations together with low first cost and upkeep.

The framework of the panel is of welded steel angles similar to the original panels but of larger section, and also having a welded coverstrip to overlap joints

Reinforcing rods, ¼-in. dia., are welded at close intervals across the panel, and wire netting is interlaced and tied to these. A steel form is fitted into the panel and the concrete poured and well worked into all spaces, and when ready is finished off to a plain or figured surface as desired.



Detail of Concrete Panel Construction

"Gardner" Standard Garage with Special Doors and Tile Roof

(Continued on next page)

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GARDNER STANDARD GARAGES

Facilities

Our garages are of special interest Clients can obtain their garage without any worry to themselves. We arrange building permits, give free advice on location, type, etc., and can have the job completed within a few days of receipt of order.

Advantages

The Advantages of the Gardner Master-built steel frame Garages are,

Fire proof; Time proof.
A continuous asset—readily saleable for removal.
Accommodating—easily moved or extended
Vermin proof -unaffected by white ants or borers.
Satisfaction—the status of Gardner Constructions is a guarantee of a satisfactory job

Where modifications of the design are desired to match existing buildings, we can submit proposals that will give satisfaction to the most exacting critic.

Windows, either fast or opening, with welded steel frame, are built into Standard panels and so can be introduced as desired.

Dimensions

Corrugated or Ripple Iron panels are standard in widths of 1 ft. 1½ in., 2 ft. 2 in., 3 ft. and 4 ft. 2⅝ in.

Fibro Cement, etc., panels are 1 ft. 0½ in., 2 ft. 0½ in., 3 ft. 0½ in., 4 ft. 0½ in. Heights of all panels are 7 ft. 0½ in., 8 ft 0½ in , 9 ft. 0½ in , 10 ft. 0½ in., or higher if necessary. Standard sizes are:—Ripple Iron: 13 ft., 15 ft , 17 ft 19 ft. and 21 ft. long, by 8 ft. 9 in., 10ft., 13 ft. or 17 ft wide. Fibro Cement; 12 ft., 14 ft., 16 ft , 18 ft., or 20 ft., by 9 ft., 10 ft., 12 ft., or 20 ft. wide.

Country Buildings

Owing to light weights and ease of erection our sections are filling a long-felt want for a cheap, strong and durable method of constructing woolsheds, shearers' huts, barns, bungalows, etc

The absence of fire risk and damage by white ants or borers appeals to the practical side, while their neat appearance compared to the usual building of this kind is an added advantage.

A Gardner Utility Garage

TROPICAL BUILDINGS

Two recent contracts to the design of the Public Works Department, Territory of New Guinea, for the supply and erection at Rabaul of nine Residential Bungalows for European occupation and four Barracks for native labourers, have been secured by Gardner Constructions Pty. Ltd. —the whole of the construction of these buildings are in Gardner Standard Units; this is another instance of the adaptability of Gardner Light Structure.

RAMSAY'S ARCHITECTURAL AND ENGINEERING SPECIFICATIONS

The Authoritative Australian Specifications Manual

(See closing pages of this catalogue for further particulars)

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

FENCES

CYCLONE
FENCE & GATE CO. PTY. LTD.

Cyclone House
Hardware Street
MELBOURNE, C.1

Turner House
24 Jamieson Street
SYDNEY

Exchange Building
Pirie Street
ADELAIDE

14k

S.A.A. File No.

Products

"Cyclone" Ornamental Gates and Fences, also Hand and Driveway Gates in Square Tube, Wrought Iron Panelling and Gates, Stairway and Balcony Balustrading, Balconettes, Chain Wire Fencing, Ring-Lock Farm and Station Fencing, Farm and Station Gates, Sheep Hurdles, Theatre and Shop Front Guards, Window Guards, Shop and Bank Grilles, Advertising Signs, Machine Guards, Factory Protection Fencing, Dog and Poultry Pens, Tennis Court Enclosures and Gates, Steel Posts, Garden Arches, Tree Guards, Flower Bed Guards, Grave Enclosures, Gate Fittings.

Manufacturing Plant

The "Cyclone" Factories in Melbourne, Sydney and Adelaide are the largest and most comprehensive of their kind in the Southern Hemisphere. Modern production methods, ideal working conditions, expert workmen, and strict supervision combine to make "Cyclone" products as good as it is possible to get them.

Trade Mark

The word "Cyclone" is the registered trade mark of Cyclone Fence and Gate Co. Pty. Ltd., and cannot legally be used except to denote goods manufactured by this Company. All goods bearing the "Cyclone" trade mark are guaranteed against any defects in manufacture.

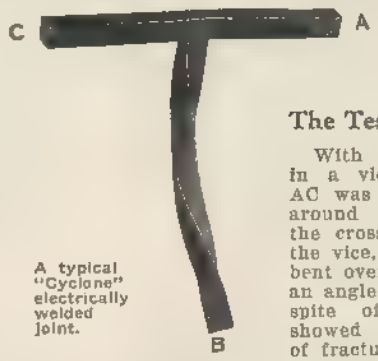
Catalogues and Price Lists

Complete information regarding all "Cyclone" products is given in our finely illustrated catalogue, copies of which will be gladly supplied on request.

WROUGHT IRON WORK

Design and Construction

All "Cyclone" work is designed and constructed upon sound engineering principles, the materials in every case being the best it is possible to secure, and the workmanship being carried out with that attention to detail and finish common to all "Cyclone" products. All joints are electrically welded, and each panel or gate is, therefore, a solid piece of metal, strong and lasting, as well as pleasing to the eye. "Cyclone" panels are made to allow two inches between panel and pier or post. It is advisable that (1) Panels should not be more than 9 ft. in length; (2) Where Panels are to be used with brickwork or stone they should be on hand before the work is started for the purpose of being built in; (3) Gate fittings for brickwork or stone should always be built in with the job.



A typical "Cyclone" electrically welded joint.

The Test

With the end B locked in a vice, the cross-piece AC was twisted completely around once. Then, with the cross-piece AC held in the vice, the section B was bent over from the weld to an angle of 35 degrees. In spite of this, the weld showed no sign whatever of fracture

Set of square tube and wrought iron gates supplied to the Dandenong High School. Each of the two centre gates has the school monogram worked into it.

Grille in oxidised finish erected in a city office. Constructed of square steel tube and wrought iron to architect's own design.

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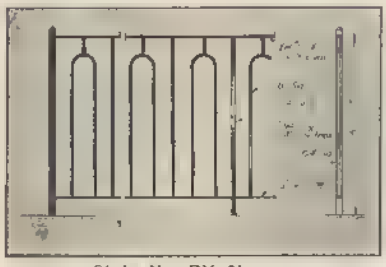
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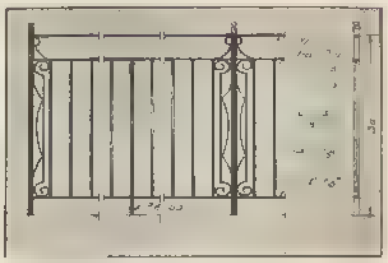
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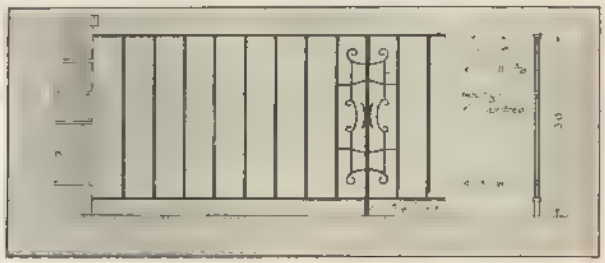
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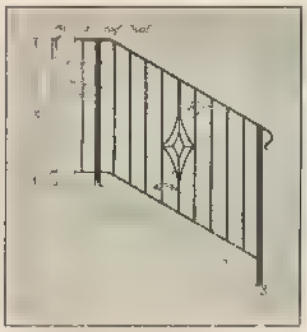
RAILINGS AND FENCES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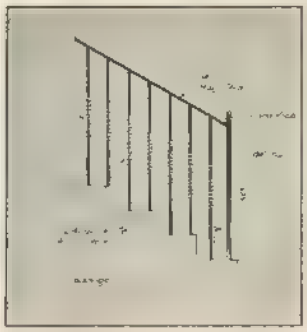
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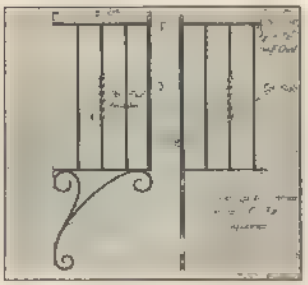
STAIR RAILINGS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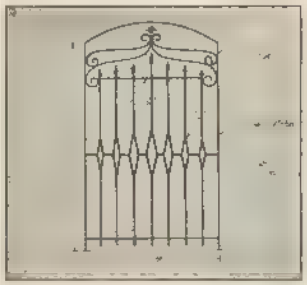
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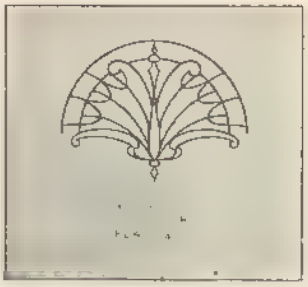
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BALCONETTE INTERNAL AND EXTERNAL GRILLES

SOME STANDARD DESIGNS OF "CYCLONE" WROUGHT IRON PRODUCTS

Designing Services Available

Many standard stock designs are always available, but work to the special designs of architects will always be carried out with pleasure. Telephone for a trained and specially qualified representative of the Company to discuss any special work required. He will submit suggestions and designs. We have the technical staff, and invite you to make use of it at any time without obligation.

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

"CYCLONE" CHAIN WIRE

Rustproof and Unbreakable

"Cyclone" Chain Wire meets all requirements demanded in modern industrial or domestic fencing.

It can be erected on wooden or tubular steel posts with wooden or metal pipe rails and plinth.

Strongly woven of special galvanized wire, "Cyclone" Chain Wire is rustproof and unbreakable and needs no maintenance. Fencing costs are therefore reduced to the absolute minimum by its use.

Where Used

Its uses are varied and many, and it is highly recommended for factory fencing, machinery guards, playground fencing, school fencing, tennis enclosures, animal cages, tree guards, suburban fencing, window guards, lift guards, stairway guards, etc.

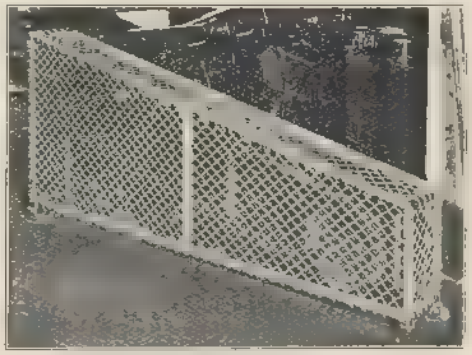
The old galvanised iron structure that previously encircled the grounds of Parliament House, Melbourne, has been replaced by a new and modern "Cyclone" Chain Wire Fence. This new "Cyclone" Fence will stand for years to come without one penny having to be spent on its maintenance.

Sizes

"Cyclone" Chain Wire is manufactured in standard heights of 36, 42, 48, 60 and 72 inches. Special heights, however, are always available.

Standard meshes and gauges are as under:

Mesh, inches—	½	¾	1	1¼	1½	2	3	4
Gauge	14	14	13	11	9	9	9	9
	16	16	14	12	10	10	10	10
				13	11	11	11	11
				14	12	12	12	
		–			13	13	13	
					14			



"Cyclone" Chain Wire Machine Guards are highly efficient and a danger is eliminated by their use.

Knuckled or Barbed Selvage

"Cyclone" Chain Wire is supplied with knuckled selvage unless barbed selvage is specified. There is no extra charge for the barbed selvage, which offers additional protection to property. Barbed selvage is only supplied on Chain Wire of No. 9, 10 or 11 gauge. Chain wire is easy to erect, and can be quickly joined or taken apart.

"Cyclone" Ornamental Gates

Suitable for entrances to parks, public reserves, institutions and private residences. "Cyclone" Ornamental Gates will not sag nor be affected by the weather. Driveway gates are constructed with frames of 1⅞-inch steel tubing covered with "Cyclone" Chain Wire or Fabric, or with bars fitted in lieu of the chain wire or fabric. Hand Gates are made with frames 1⅛-in. steel tubing and covered as before.

Enquiries should state width of gate opening; we make allowance for hinges and catches. In pairs of gates of unequal leaves, it is necessary to advise us on which side the small gate is to be hung viewed from the outside.

"Cyclone" Fabric Fences

"Cyclone" Fabric Fences make admirable frontage fences for suburban or country homes, parks, public gardens, etc. They are graceful and strong, and enhance the appearance and value of any property. In addition, they are inexpensive to erect and cost practically nothing to keep in order or repair. Made of the best galvanized wire procurable.

We quote for the complete erection of "Cyclone" fences in any suburb. Ask for our traveller to call. As our workmen are all skilled tradesmen, we can guarantee satisfaction.

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

14k

S.A.A. File No.

T. N. CHUCK WIRE FENCE & GATE CO. PTY. LTD.

3 BARKLY STREET, BRUNSWICK, N.10
VICTORIA

TEL. BRUNSWICK 1287

CHUCK QUALITY and SERVICE

CHUCK PRODUCTS

Chuck Ornamental Fabric Fence.
Chuck Metal Driveway Gates.
Chuck Metal Hand Gates
Chuck Wrought Iron Panels and Gates.
Chuck Chain Wire Fence
Chuck Factory Protection Fences.
Chuck Machinery Guards, Theatre, Shop-front and Window Guards.
Chuck Metal Sky Signs
Chuck Ringknot Farm Fence

Facilities—Quality

Our factory is completely equipped with the most modern plant and machinery, enabling us to meet promptly and efficiently all demands for the above products.

The quality of Chuck products is best evidenced by the numerous installations for public bodies, leading commercial organisations, and upon many of Victoria's largest private estates.

General Catalogue sent on request.

Advisory and Erection Service

Estimates will be given for products either delivered or erected complete (in the suburbs). An engineering staff is maintained, and contracts for designing and erection complete are made when desired. Send us a rough sketch of your requirements, and we will submit designs, give full particulars of erection or installation and quote you prices for standard products, or for special work. This service places you under no obligation.

CHUCK CHAIN WIRE

Chuck Chain Wire is recommended for protective fencing for factories, mills, mines, country clubs, schools, parks, tennis courts, orchards, and dog yards, and for enclosures, window, door and machinery guards, also for factory and warehouse partitions.

It is made of strongly woven wire, galvanised by the hot-dip process. It is unbreakable and requires no maintenance.

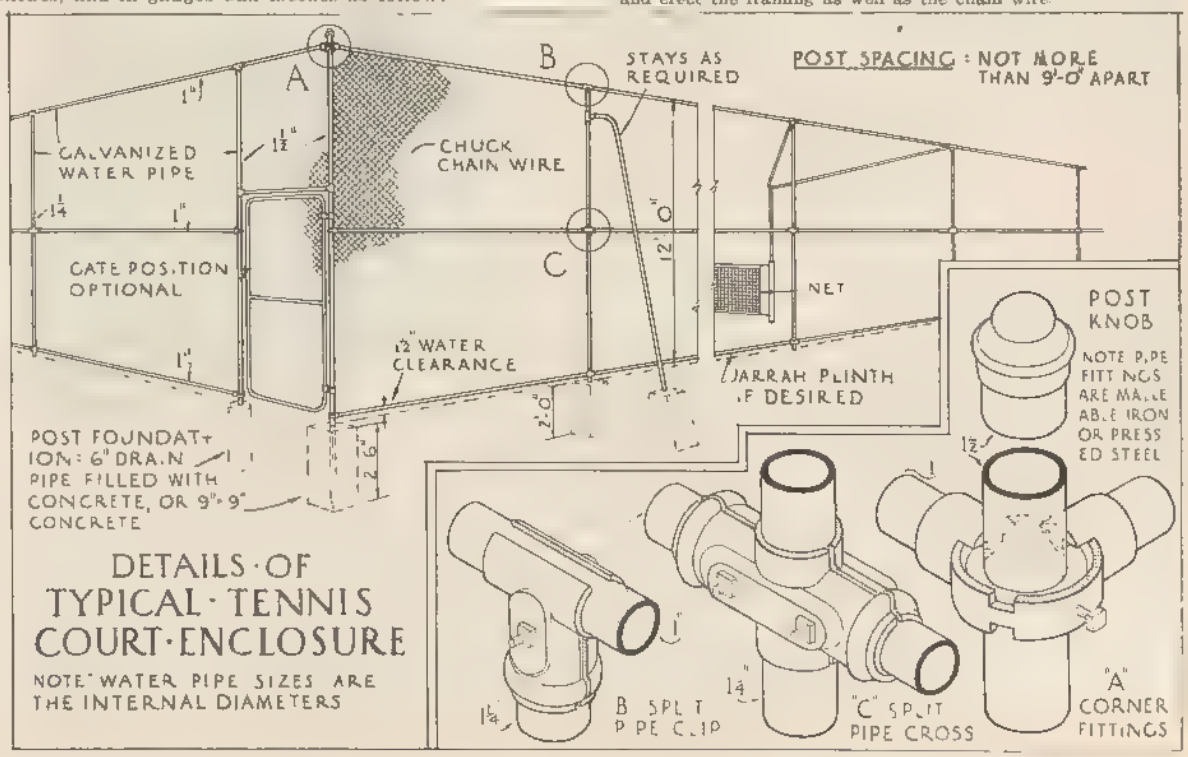
Standard Sizes.—In heights of 36, 42, 48, 60, and 72 inches, and in gauges and meshes as follow:—

Mesh in inches.	¾	1	1¼	1½	2	3	4
Gauge in inches .	14	13	12	9	9	9	8
.	—	14	13	10	12	10	9
.	—	—	—	12	13	11	—
.	—	—	—	13	—	—	—

Special heights up to 18 ft. can be supplied if desired.

Fixing. Chuck Chain Wire can be laced on to tubular steel posts and rails, or erected on wood framing by means of staples.

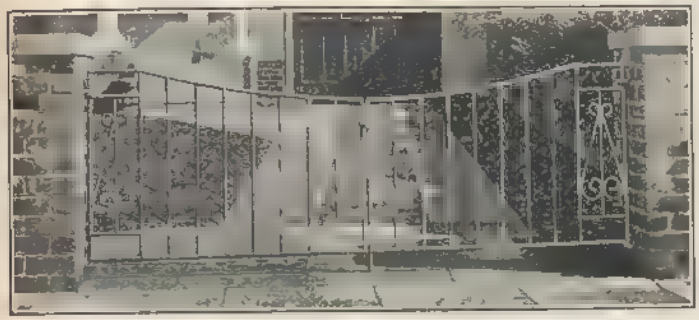
The drawing below shows recommended details for tennis court enclosures. The Chuck Chain wire used for this purpose is generally 1½-inches mesh and 13 gauge. We are able to supply and erect the framing as well as the chain wire.



(Continued on next page)

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

Wrought Iron hand gate and fence panel designed and erected by us in South Yarra.



Chuck Wrought Iron Products

All joints are electrically welded, making each gate or panel a solid piece of metal

Designs. A wide range of stock designs are available, but we are pleased to carry out special work in accordance with architects' specifications. When enquiring please state the following:—

Neat distance between posts

Which half of gate to open in pairs of gates

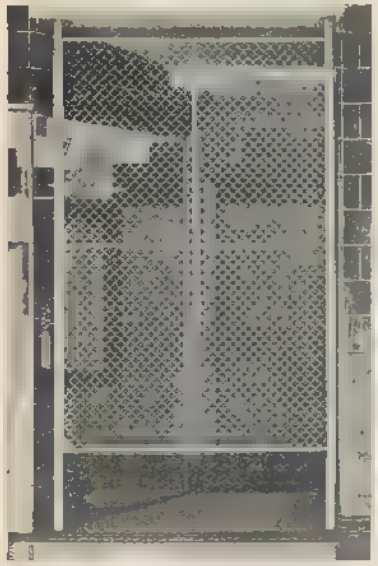
Length of Panels should not be more than 9 ft., and built in during erection of piers

Standard Specification. Unless otherwise specified, steel panels are manufactured in ⅝ in. square section mild steel, outside frame with ½ in. square filling to outer frame. Panels of all ⅝ in. section can be made. Where extra heavy panels are required, the outside frame can be of ⅞ in. square section with ⅝ in. filling

Left—Wrought Iron double gates erected by us in South Yarra.

Below—Pair of Wrought Iron gates made by us to Architect's design and erected in Caulfield

Chuck Chain Wire Products



Above—Chuck Chain Wire Entrance Guard. A neat and effective guard, giving a clear view of the doorway.

Right—Chuck Chain Wire Tennis Court Enclosure. The posts and rails are tubular steel, with 1¼ in. mesh x 13 gauge Chuck Chain Wire Panels.

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

ORNAMENTAL STEEL DEPARTMENT

Fig. 1

Patent Stud Weld

The photo. (Fig. 1) shows a test piece of stud weld after it had been put in a vice and hammered with jarring blows from a heavy hammer on the ends of the cross bar till it bent and twisted as shown in a length of only ⅝ inch without any disconnection at the weld whatsoever. By means of the patented stud weld, for the use of which Hume Steel Ltd. hold exclusive rights, the two units have been actually fused through to the very centre of the bars into one homogeneous section (see Fig. 2—a sawn section through weld). The strength of this patented weld is remarkable, and far exceeds that of any ordinary welded flush joint, which is usually only welded together each side, whilst very little penetration is obtained and the centre of the work is not welded at all. This patent weld is used on all Hume Steel Fence Department products, unless otherwise specified. Flush welds may be produced, if so desired, by grinding the studs down flush with surface of the work.

Fig. 2

Wrought Iron Gates as Supplied by Hume Steel Ltd.

Gates

Manufactured of Hume Steel, stud welded, in attractive designs and of rugged strength, are obtainable for all purposes. They are properly proportioned and correctly made in all details. The following standard sizes of bars are used. Outside bars, ⅝ in. square; internal bars, ½ in. square.

Sizes

In applying for estimates or consultation service, measurements for gates should be given indicating the neat distance between the piers, and showing which half of the gate is required to open and which half is to be bolted. For standard double gates allow an 8 ft. (or 9 ft.) opening between the piers. For single gates, 3 ft. 6in. (or 4 ft.). Height of standard gates 3 ft. from ground up to top bar. The hinges are set into brickwork at 30½ in. from G.L. to C.L. of bolt of hinge. Single gate catches at 26½ in. above G.L.

Steel Fence Panels

Unless otherwise specified, steel panels are manufactured in ½ inch square section M.S. Bar, arc-welded at all joints by Hume special patented process. Some designs have a top rail of ⅝ inch square bar, or a 1½ inch x ⅝ inch half round handrail section. The standard designs of fences with gates complete are available for any frontages from 48 feet to 60 feet, within two days of order. Special designs can be supplied within nine days.

Fixing Fence Panels

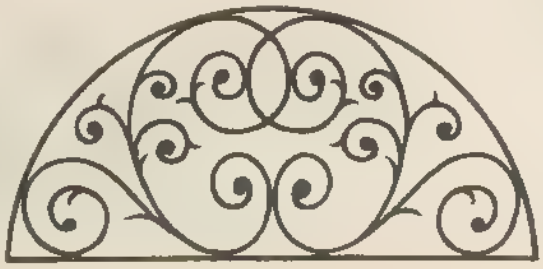
The panels are usually [illegible] piers whilst these are in course of erection. Standard lengths are carried in stock to suit openings of 7 ft. 9 in. to 8 ft. 6 in. between piers. We will undertake erection of our products in any locality whenever required. The work, however, is so extremely simple that the contractor is usually able to complete erection independent of our assistance.

Designs

Designs of gates to suit all requirements, such as hand-gates and drive-gates for residences; school gates, gates for parks, sports grounds, etc., etc., are ready for inspection by architects at any time. There is a wide selection of designs—period, modern and futuristic motifs—available. Whether ornamental or of simple construction, each model is eminently efficient in operation, and extremely durable. Estimates will be gladly given for the construction of gates according to special designs specified by the architect.

Balustrading

Balustrading and handrails can be effectively produced by Hume Steel arc welding. Special designs to suit architects' requirements can be carried out. The Balustrading is usually made up of the following sections—Top rail, 1½ in. x ⅝ in. of a handrail section, remaining bars, ⅝ in. to ¾ in. square section—the whole flush welded.



(At left)—
Hammered Iron Grille, in Armour-bright finish — designed by Leslie J. W. Reed, A.R.V.I.A.

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

"WARATAH" WIRE AND WIRE PRODUCTS

RYLANDS BROS. (AUST.) LIMITED

(An Allied Industry of B.H.P. Co. Ltd.)

NEWCASTLE, N.S.W.

WIRE MILLS: NEWCASTLE, N.S.W.

Offices:
SYDNEY — ADELAIDE — MELBOURNE — PERTH — BRISBANE

14

S.A.A. File No.

PRODUCTS

Motor Passes—5, 10 and 20 ton Main Road types; 5-ton Inter-Paddock type. Stands for Main Road Passes.

Steel Fence Posts "Waratah" B.H.P. *Star* Section—Black, Varnished and Galvanized.

Fencing Wire Galvanized, Black, Varnished, High Tensile Galvanized, Patented High Tensile Galvanized.

RYLANDS BROS. (AUSTRALIA) LTD. MADE IN WARATAH AUSTRALIA FROM THE ORE TO THE FENCE AUSTRALIAN

Barbed Wire—Iowa, Waukegan and Glidden patterns in all gauges

Wire Netting — Rabbit-proof, Sheep and Dog-proof, Poultry. All miscellaneous sizes.

"Waratah" Fence — (Hinged Joint) Galvanized. Ordinary and High Tensile qualities.

"Flexo" Droppers—Galvanized.

Chain Mesh — Crapo Process, Galvanized.

"WARATAH" MOTOR PASSES

Manufacture

"Waratah" Motor Passes, made from B.H.P. steel, have been introduced to provide reliable equipment of ample strength to take the place of make-shifts They are constructed of steel rails and girders, and are finished in aluminium paint. The standard designs are used as by-passes for motor traffic alongside gates across roadways, and the special design passes are for use in the line of the road where motor traffic is heavy, the usual gate being erected alongside as a by-pass for stock.

"Waratah" 20-50 Ton Pass on Steel Stand. Total Weight, exclusive of Stand, approx. 1 Ton. Weight of Heaviest Unit, 200 lbs.

Special Features

No gates to open.

No speed limit. Cross at any speed, as you would a culvert.

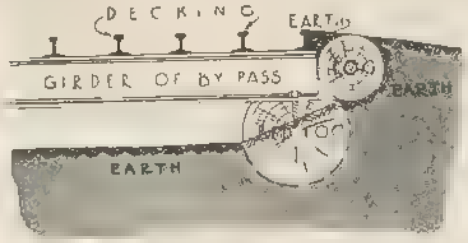
Stock and Rabbit proof

All steel, Fire and White Ant proof.

Having no wheel tracks, motor vehicles can drive over any part of the full width.

Nothing to wear out or come adrift; no short sections bolted together—just a complete massive unit.

Types.	Size.	Axle Load in Tons. Normal.	Emergency.
Main Road (heavy)	10ft. x 6ft.	20	50
Main Road (standard)	9ft. x 6ft.	5	8
Inter Paddock	7ft x 4ft 6in	5	
Inter Paddock	7ft x 3ft	5	



Cross Section showing Method of Erection Without the Use of Supporting Stands.

"WARATAH" STAR SECTION FENCE POSTS

This type of post marks a new development in steel fencing. It is exceedingly rigid, is protected from rust by a heavy tenacious weather-resisting black varnish or galvanizing, is fireproof, and eliminates the labour of post-hole digging, the posts being simply driven where required, a driving cap being used if ground is very hard.

"Waratah" B.H P. Star Section steel posts are carried in stock in 5 ft. and 5 ft 6 in. lengths, and bored to standard spacings, though the posts may be bored to any spacings. Standard spacings. Top of post to first hole, 1 in., then 6 in., 6 in., 8 in., 6 in., 5 in., 5 in., 6 in.

No extra charge is made for special spacings in quantities of 100 and over. "Waratah" B.H.P. steel posts are the strongest on the market A post laid on supports 4 feet apart withstood concentrated load of 330 lbs in the centre without bending. A load of 640 lbs. was required to bend the post 3 inches. These posts are made from B.H.P. high carbon steel and are supplied black, varnished, or galvanized.

AVAILABLE SIZES.

Standard Lengths	4ft. 6in.	5ft.	5ft. 6in.	6ft.	6ft. 6in.	7ft.	7ft. 6in.
Approx. Wt. per Bundle of Ten in lbs.—	55	62	69	74	80	86	92

(Continued on next page)

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

"WARATAH" FENCE WIRE

The Newcastle wire plant is the largest in the Southern Hemisphere and is also one of the most comprehensive in existence. Available wires of various types, tempers and finishes are briefly stated below.

Plain Galvanized.—In all gauges, 4 to 14 I.S.W.G. Hard, medium, and soft temper. In hundredweight coils.

"Waratah" Galvanized Fencing Wire is made from specially selected steel carefully processed and galvanized by the hot process with pure electrolytic zinc.

Black Varnished.—In all gauges, 4 to 14 I.S.W.G. Hard, medium, and soft temper. In hundredweight coils.

"Waratah" Black Varnished Fencing Wire is made from the same steel as Galvanized Fencing Wire, and is treated with black weather resisting varnish.

High Tensile, Galvanized.—In hundredweight coils. All High Tensile Wire is made from selected high strength grade steel, hot galvanized with electrolytic zinc, and every coil is tested for breaking load.

"Waratah" High Tensile Wire is made in the following grades

Ordinary Quality—12½ gauge—850, 1,050, 1,140 lbs. breaking loads

"Tyeasy" Patented Quality—12½ gauge 1,250 lbs. breaking load. 14 gauge—700 lbs. and 850 lbs breaking load.

"WARATAH" GALVANIZED BARBED WIRE

Gauge	Approx. length per cwt. yds.	Approx. weight per mile. lbs.	Approx. breaking load in lbs.
IOWA PATTERN			
12	460	429	1,140
13	560	352	915
14	670	294	675
WAUKEGAN PATTERN			
12½	520	318	1,020
14	880	229	650
14*	930	212	650

*Waukegan Long Distance.

Glidden Pattern to special orders.

"Waratah" Barbed Wire is wound on wooden reels containing 1 cwt. net weight.

"WARATAH" WIRE NETTING

"Waratah" Wire Netting is guaranteed straight and flat, and is wrapped in black waterproof paper whilst in store. It is carefully woven from the most suitable wire and hot galvanized after weaving with pure electrolytic zinc. Every coil bears the maker's identification tags, as illustrated on this page. "Waratah" Wire Netting is supplied in 50 and 100 yard rolls, except ½ in. and ¾ in. meshes, which are supplied in 25 and 50 yard rolls. Rabbit, Sheep and Dog Netting is usually supplied in 100 yard rolls, and 2 in. Poultry and Miscellaneous Netting in 50 yard rolls

Available Widths, Meshes and Gauges

Mesh Inches	Widths, Inches.	Gauges.	Remarks
½	6 to 72	19, 20, 22	Usual gauge, 22
¾	6 to 72	18, 19, 20, 22	Usual gauge, 20.
1	6 to 72	17, 18, 19, 20	Usual gauges 19 and 20.
1¼	6 to 72	16 to 19	Standard Rabbit Netting in A and B qualities. 36 and 42 in. widths, 17 18 G
1½	6 to 72	16 to 19	Ditto, also mesh in 17A quality for tennis courts
1⅝	12 to 72	16 to 19	Little used.
2	6 to 72	14 to 19	Standard Poultry Netting; also in 16 and 17 G, for tennis courts.
2½	12 to 72	14 to 19	Little used.
3	12 to 72	12 to 19	30, 36 in. widths, 16, 17 gauge are widely used, suitable for sheep and dogs
4	12 to 72	12 to 18	Ditto.

Note. "A" and "B" denotes heavy and light sizes of the same gauge—not first and second quality

"WARATAH" CHAIN MESH (CRAPO GALVANIZED)

Manufactured from Crapo processed galvanized steel wire, which is particularly suited for this fabric, as the Crapo process insures an extra heavy coat of galvanizing which will not crack or flake, even though the wire be bent at right angles, or wrapped around its own diameter. Rylands Brothers (Aust.) Ltd. hold the sole manufacturing rights of Crapo Process Galvanized Wire.

"Waratah" Chain Mesh is made in all widths up to 9 ft., and in standard meshes from 1½ in. to 3 in.

"Waratah" Chain Mesh may be supplied with a woven in selvedge wire, giving great strength and making the mesh particularly suitable for road-guard purposes, or it may be finished with one of the other forms of edges illustrated in Figs 2 and 3

Uses

Fencing of all descriptions, Machinery Guards, Road Guards (absorbs impact of out-of-control vehicles), Screens for grading materials, Enclosures for Switchboards and Electrical Gear, Barriers for Tool Stores, Display Racks, etc

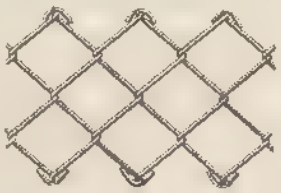


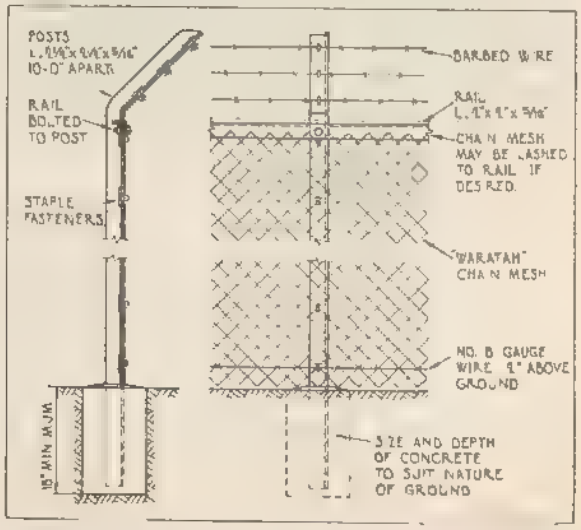
Fig. 1.

Fig. 3.

Fig 2.

Methods of Fixing

"Waratah" Chain Mesh may be fixed to wood and pipe framing by employing the usual methods of fixing When fixing to "Waratah" Star Section Fence Posts, galvanized staples are used. The method of fixing and erection illustrated below ensures a rigid, strong and permanent fence suitable for most industrial purposes.



From the collections of Sydney Living Museums / Historic Houses Trust of NSW

SECTION G

[Containing S.A.A. Filing Sections Nos. 15, 16, 17, 18 and 28a]

ORNAMENTAL METAL WORK

—and—

METAL DOORS AND WINDOWS

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

16e

AUSTRAL BRONZE COMPANY LTD.

SYDNEY AND MELBOURNE

Established 1915.

Head Office and Works:
BRASS AND COPPER ROLLING MILLS, O'RIORDAN ST., ALEXANDRIA, SYDNEY, N.S.W.
Branch Office and Bulk Store:
101-103 KING STREET, MELBOURNE
Selling Agents:
NOYES BROS (Sydney) LTD., 115 CLARENCE ST., SYDNEY

EXTRUDED METALS

[For Other Products, See Index]

EXTRUDED METALS

History

Although it is recorded that the extrusion of Copper and Copper and Zinc Alloys in the form of bars and rods was invented in 1894 (by the late Mr. Alexander Dick), it was not until 1921 that the production of Extruded Rods, Bars and Special Sections was undertaken commercially in this country—the pioneers being Austral Bronze Company Limited, who established this particular industry at their extensive works in O'Riordan Street, Alexandria, Sydney, N.S.W., where some hundreds of tons of Extruded Sections have been produced during the past ten years for various industries throughout the Commonwealth

Manufacture—Characteristics

The Extrusion process consists of forcing metal, heated to a semi-plastic state, through a steel die by hydraulic pressure, which produces shapes with the following advantages:

The Bars obtained are uniform in cross section, with sharp corners and clean cut lines, accurately reproducing the architect's designs.

The surfaces are smooth and sufficiently true to dimensions to require little, if any, machining.

Extruded shapes being wrought under great pressure, are free from blow-holes, and other defects usually common in sand-casting, and, in the case of bronze, have a tensile strength in excess of 20 tons per square inch

Extruded shapes can be used in thinner cross sections and finished with less labour and are consequently not so expensive as the majority of machined castings.

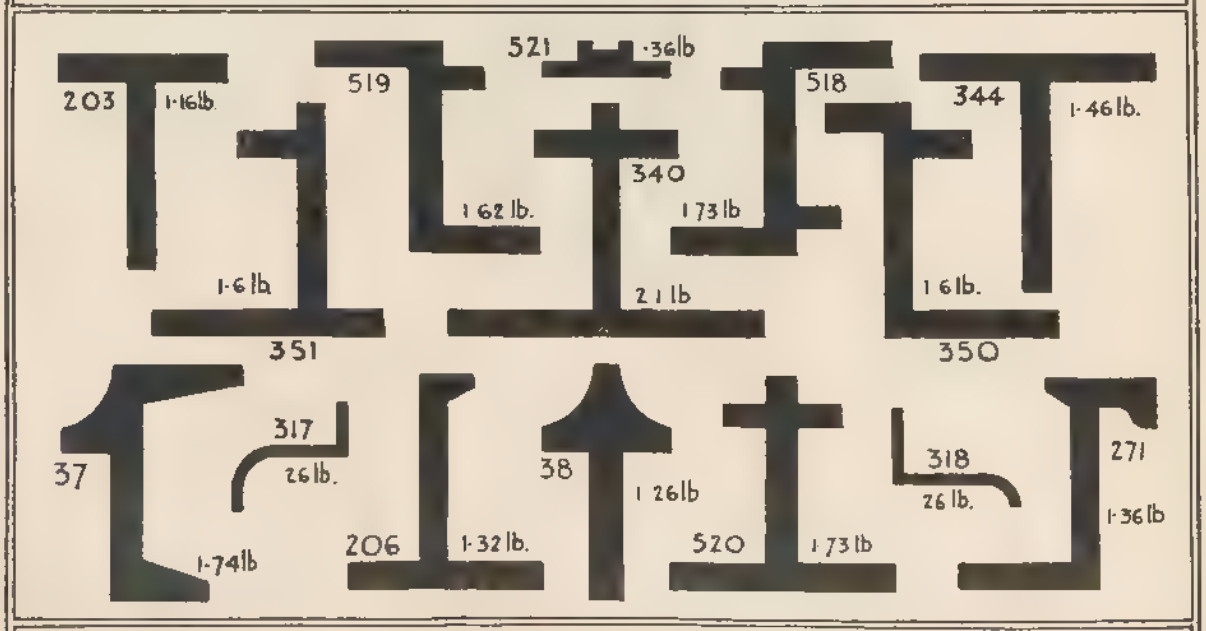
"Austral" Extruded Bronze Sections have a mature golden colour which can be artificially coloured by the fabricators to obtain various effects, such as statue bronze, Verdi Antique, Flemish Brass, or other oxidised finishes.

"Austral" Florentine Bronze has a rich Florentine Bronze colour, and is in great demand for window framing and other details of architecture.

Service

Austral Bronze Company Limited have spared no expense in developing the extrusion of Bronze, Brass, Copper and Aluminium for architectural, electrical and general engineering purposes, and lithographs detailing over 600 Special Sections supplied to Australian and New Zealand users can be had on application to the Company, who will be pleased to advise clients on all matters relating to extruded metal sections and to submit prices on receipt of particulars as to requirements.

EXAMPLES OF "AUSTRAL" EXTRUDED BRONZE WINDOW SECTIONS

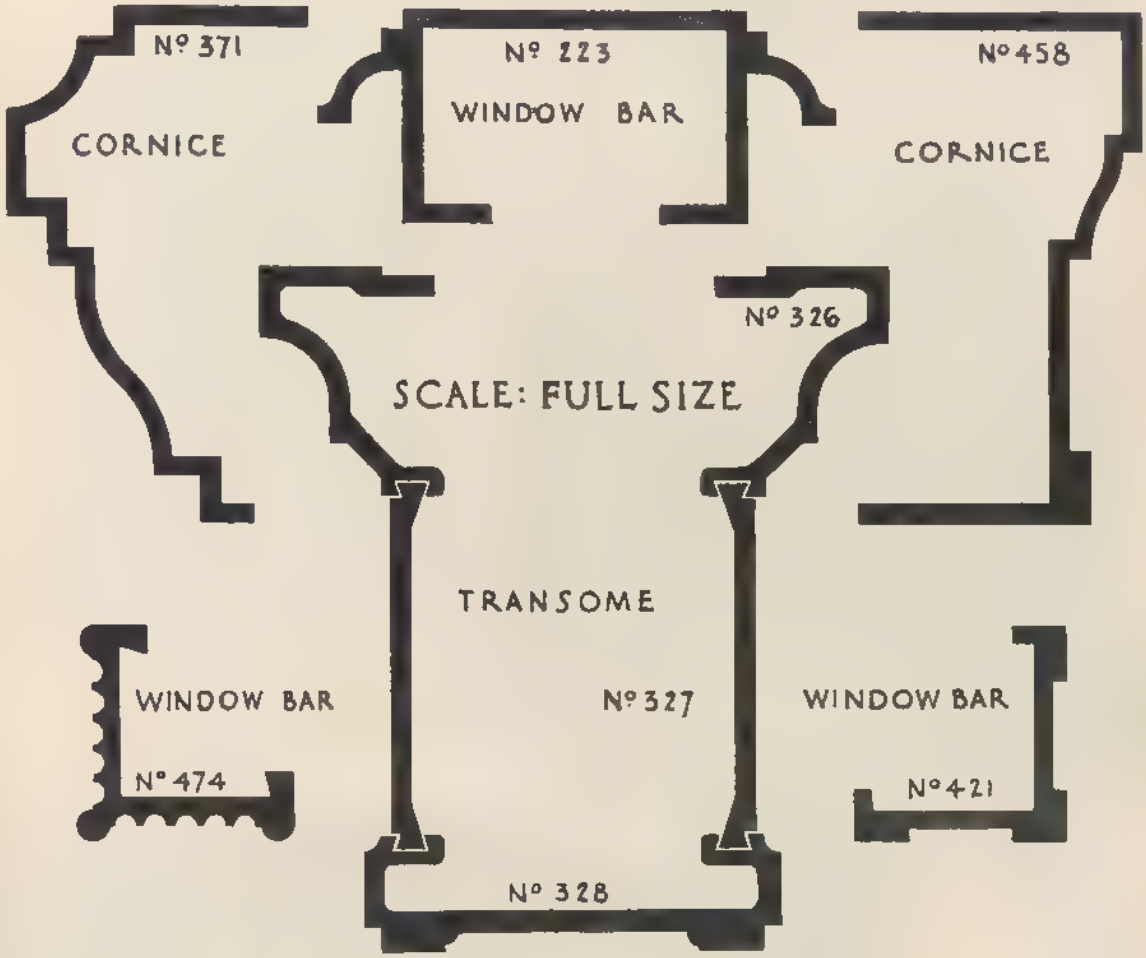


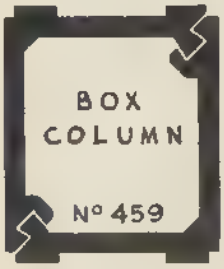
SCALE - FULL SIZE EST. WEIGHTS GIVEN ARE PER FOOT RUN

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

"AUSTRAL"

ARCHITECTURAL EXTRUDED BRONZE SECTIONS





DESIGNS SHOWN ARE SELECTED FROM
A LARGE RANGE OF ORNAMENTAL SECTIONS

FULL PARTICULARS
MAY BE HAD ON APPLICATION

PILASTER Nº 356

MANUFACTURED BY
~ AUSTRAL BRONZE COMPANY LIMITED ~
SYDNEY & MELBOURNE

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

15a

S.A.A. File No

WM. BEDFORD LTD.

Artists in Metal

(Established 1890)

476-490 LONSDALE STREET, MELBOURNE

SHEFFIELD HOUSE, PITT STREET, SYDNEY

Architectural BRONZE

[For Other Products, See Index]

ARCHITECTURAL BRONZE

(See also page 314)

Products

Fine Architectural and Ornamental Metal Work, executed in Bronze, Brass, Nickel Bronze and other metals. A partial list of products includes the following:—

Architectural and Decorative Castings.
Altars.
Bank Screens and Fittings
Balustrades.
Bulletin and Directory Cases
Candelabra
Display Cases.
Ecclesiastical Wares.
Grilles and Guards.
Lamps.
Letters and Figures.
Mausoleum Doors.
Memorial Tablets.
Plaques.
Pulpits
Railings
Seats
Signs
Ticket Booths.
Urns and Vases.
Special Hardware.

Caulfield City Hall, Victoria
Bronze Lettering on Facade (above)

City of Caulfield Bronze Memorial Tablets in the foyer, showing 11 of the 32 tablets containing 1,600 names (at right)

Architects Messrs. Jenkin and Goldsmith, Melbourne

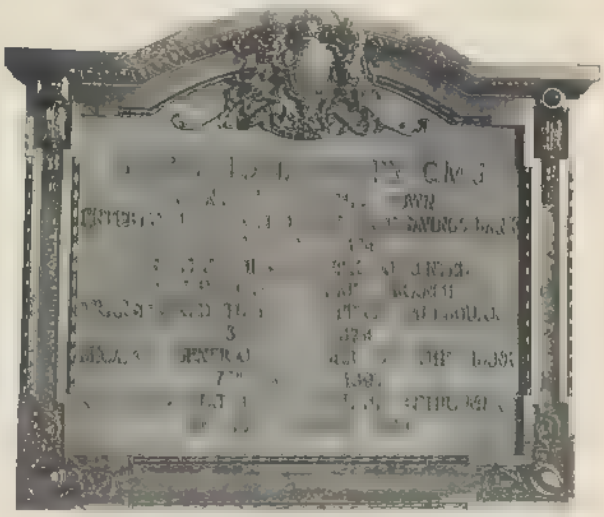
(Continued on next page)

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

Memorial Tablet, Boys' High School, South Yarra, Victoria

Architect Chief Architect, Dept. of Public Works, Melbourne.

Window Grilles, Science House, Sydney.
Architects: Messrs. Peddle, Thorpe & Walker.

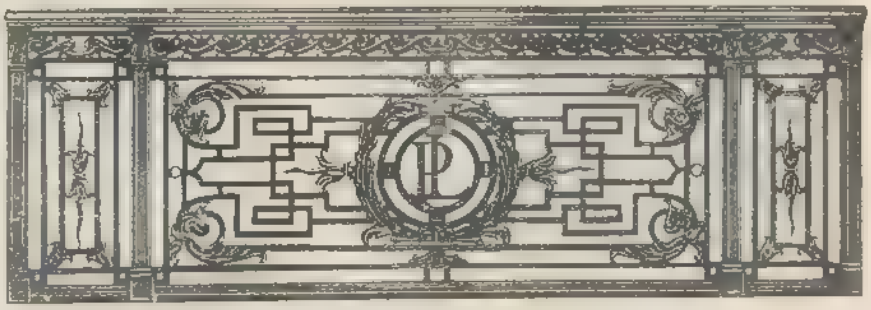


Bronze Tablet executed for the State Savings Bank, Victoria

Architects Messrs. Godfrey & Spowers

Facilities

After years of organisation and planning we have provided a consultory and designing department which has become highly specialised and can be taken as authoritative. Our long experience qualifies us to handle the most difficult and exacting architectural requirements. Our artists and craftsmen are instructed to execute all our work in the most thorough and painstaking manner.



Solid Bronze Grille (Double-faced), Public Library, Melbourne.

Architects Messrs. Irwin & Stevenson.

(Continued on next page)

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

Counter Treatment in Bronze, consisting of Grilles, Panels and Footrails—offices of the Melbourne "Argus."
Architects: Messrs. Godfrey & Spowers.

Ornamental Bronze

For balustrades, bank cages grilles, mail boxes, railings—in fact, for all ornamental features solid bronze is the logical metal to use. Nothing else lends itself so well to the artistry of perfect craftsmanship — witness the fact that it was the metal chosen by the fine Italian workmen for those exquisite works of beauty. In bronze, details can be delicately wrought, sharply incised, or crisply undercut. It is strong and permanent. With no other metal is it possible to get the range of colour that is possible in ornamental bronze. It remains beautiful after years of exposure, and need not be painted, for it does not rust.

Italian Renaissance Grille to Ticket Window
Comedy Theatre, Melbourne.
Architect Chas. N. Hollinshed, Esq.

Stair Newel, Palais Theatre, St. Kilda, Victoria
Architect H. E. White, Esq.

(Concluded on page 31½)

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

LIPS

WM. BEDFORD LIMITED

476-490 LITTLE LONSDALE STREET
MELBOURNE

Australasian Agents for
LIPS' SAFE AND LOCK WORKS LTD.,
LONDON AND HOLLAND

18

S A A File No.

[For Other Products, See Index]

SECURITY DEPARTMENT

Products

Safes in eight grades, Strongroom Doors, Safe Deposits, Wall Safes, Roller Shutter Cupboards, Steel Cupboards, Steel Shelving for books, Steel Shelving and Partitions for Strongrooms.

Lips' Reputation

On the Continent of Europe the name of Lips is a household word where security devices are known.

It is acknowledged that the cracksman's "profession" reaches its highest "standard" on the Continent, and Lips have, during the last 50 years, stood in the front rank of manufacturers, and are always the first in the world to introduce new improvements to combat the latest developments in the methods adopted by the enterprising members of the "nefarious profession."

"C" Quality.
Branch Bankers' Quality.

Information to Architects

Before specifying security products, ask for a complete list of Lips' various grades of Safes and Strongroom Doors.

Lips state the precise degree of protection which each of their manufactured units afford, and so, the purchaser knows exactly what his Safe or Door is capable of withstanding.

The Agents have a complete range of these products, and would be pleased to demonstrate to you.

Ask for a copy of "Why a Lips' Safe or Strongroom Door is Preferred," also for the list and illustrations of prominent installations of Safes, Strongrooms and Safe Deposits in the most important banks of the world

Fire-Proofing

All Lips Security Products are provided, between the inner and outer bodies, and in the doors, with thick layers of Lips Steam Generating Non Conducting Composition, which effectively protects the contents of the Safe from scorching in cases of fire

The Branch Bankers' Quality, as supplied to Prominent Australian Bankers and Insurance Companies.

LIST OF SAFES AND STRONGROOM DOORS

Type	Purpose	Particulars of Protection.
SAFES—		
A Type	Book Safe . . .	Fire-proof, Thief-resisting
B Type	Warehouse Safe	Fire proof, Fall, and Burglar-resisting.
C Type	Branch Bankers' Safe	Fire-proof, Fall-proof Sincere protection against the Burglar
D Type	Book Safe . . .	Fire proof, Fall proof
E Type	Branch Bankers Safe . . .	Fire-proof, Fall-proof Entirely armoured, protection against blow-pipe over vital lock parts
E & F Type	Bankers Safe	Fire-proof, Blow-pipe-proof Complete protection against "Thermite" and the electric arc Also Wall and Crane-Hinged Safes
STRONGROOM DOORS—		
003 Type .	Book Safe .	Protection against Fire, Thief resisting
102 Type .	Book Safe . .	Protection against Fire, Burglar-resisting
202 Type .	Branch Bankers'	Fire proof; Sincere protection against the Burglar, Protection against Blow pipe over vital lock parts
302 Type .	Bankers' Quality	Complete protection against Fire, Burglary and Blow pipe
402 Type	Bankers' A1 Quality . .	Complete protection against Fire, Burglary and Blow-pipe, with Inter-locking Step Frame.
502 Type	Bank Head Office Quality	Complete proof against Fire Burglary and Blow-pipe, with bright steel Inter-locking Step Frame; heavy construction.
601 Type . (Crane Hinged)	Bank Head Office Quality	Complete proof against Fire, Burglary, Blow-pipe and Explosives, with Crane Hinge and Screw Compression Mechanism.

"A" Quality
Warehouse Quality.

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

16a

S.A.A. File No.

BROOKS, ROBINSON PTY. LTD.

ELIZABETH STREET, MELBOURNE

WORKS: MAFFRA STREET, SOUTH MELBOURNE

Telephone M 3131 (5 lines)

B—R

[For Other Products, See Index]

Products

Ornamental Metal Windows; Entrance Doors and Bronze Grilles.

Architectural Bronze Work

Brooks, Robinson Pty. Ltd. have pioneered the manufacture of Architectural Bronze Work in Australia, most of their work being of a highly specialised character requiring a very high order of workmanship and design Examples of this work may be seen in most of the important public buildings erected in Australia during the past 15-20 years.

The operations entailed in the production of Architectural Bronze work are Selection and preparation of material, production of dies for moldings, stiles, cornices, etc., drawing metal through dies over specially-seasoned wood cores, and framing up of the various units. Where cast ornaments and moldings are included, patterns have to be carved The various locks, bolts, hangers, etc., are then fitted, the exposed surfaces are polished and either lacquered, or, as is most usual and recommended for outside work, an oxidised finish is applied

A combination of drawn metal stiles and rails with either cast or extruded moldings is found to be the most satisfactory method of construction and has been used in some of our more recent contracts

Grilles

The use of bronze grilles in front of plateglass panels in doors and windows is very popular where a light appearance, accompanied by a maximum of protection, is required

These grilles are of solid cast bronze, with turned, twisted or plain bars. For the purposes of cleaning, either the grille may be hinged, or, as is usually adopted, the frame holding the glass panel is hinged.

Brooks, Robinson Pty. Ltd. are equipped to design, manufacture and instal bronze grille work, and are specialists in this work as applied to banking and similar applications

Metal Trim

As manufactured by Brooks, Robinson Pty. Ltd., metal trim becomes of definite ornamental value Corners are sharp and molds are true to form. Metals used are bronze, brass or steel, and a large variety of finishes are available

SOME RECENT CONTRACTS.

State Government Savings Bank of N.S.W
Architects: Messrs. Ross & Rowe

A.M.P Building, Melbourne
Architects Messrs. Bates, Smart & McCutcheon

Bank of Australasia, Melbourne
Architects Messrs. A. & K. Henderson

Bank of N.S.W., Brisbane
Architect Francis R Hall.

Government Savings Bank, Sydney
Entrance Doors—Bronze

Electricity Commission, Melbourne.
Bronze Doors.

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

REGISTERED TRADE MARK

CHUBB'S AUSTRALIAN COMPANY LTD.

W th Which s Incorporated

RICHARD BROTHERS

Art Metal Workers

164 CLARENCE STREET, SYDNEY. 120 QUEEN STREET, MELBOURNE

Works at ELIZABETH STREET, WATERLOO, SYDNEY.

Agencies At:

BRISBANE: James Campbel & Sons Pty. Ltd. ADELAIDE: Burns, Philp & Co. Ltd.
PERTH: Harris, Scarfe & Sandovers Ltd. HOBART: Charles Davis Ltd.
WELLINGTON, N.Z., A. C. Gillies & Laird Ltd.

18

S.A.A File No.

MADE IN AUSTRALIA

Strongrooms, Safe Deposits; Reinforcements for Strongrooms; Strongroom Doors; Safes; Steel Grilles; Steel Shelving; Locks; Two-Speed, Bi-Parting, and Single Sliding Hollow Metal Lift Doors; Chubb Patent Lift Door Closers and Oil Checks, Pressed Metal Lift Cars, Hollow Metal Office Doors and Partitions; Pressed Metal Jambs, Architraves, and Skirtings; Wrought Iron Entrance Gates; Wrought-Iron Balustrading; Collapsible Gates; Architectural Bronze Work; Bronze Entrance Doors.

STRONGROOM DOOR.

The progress of Metallurgical Science the introduction of higher temperatures with the Oxy-Flame, and the growing knowledge of the use of liquid explosives, have been the guiding factors in the construction of CHUBB DOORS.

The door of any strongroom must be at least 50 per cent. stronger than its walls, as records prove that attacks are more numerous on door than on walls.

The door illustrated is the type that should be adopted for small strongrooms, and is manufactured of tough steel, one piece castings, into which Chubb Anti-Blow-Pipe and Drill-Resisting Alloy is poured. The bolt work is controlled by at least two Keyless Combination Locks, which give over a million different combinations, and the dials of these locks can be controlled by a Dial Check Keylock, the keyhole of which does not pass through the main door slab.

The frame of the door is connected to the frame of the ventilating gate by tough steel vestibule plates.

MANHOLE OR EMERGENCY DOOR

This is similar in strength to the principal entrance door, serving the purpose of admission to a strongroom—caused by a lockout—and also providing the means of suitable ventilation system, by means of swinging air ducts from the forced air system throughout any modern building.

CHUBB'S ANTI-BLOW-PIPE STRONGROOM DOOR FOR BRANCH BANKS.

SPECIFICATION.

Supply and install, as shown on plans, a Chubb Anti-Blowpipe Strongroom Door. A masonry opening to be formed, in accordance with drawing to be supplied by Chubb's.

STEEL LINING.

The advantages of a steel lining to a strongroom in conjunction with the use of Tangbar Reinforcement are many; one of which is that it gives greater hours of resistance because the penetration is impeded by the fact that the concrete is only broken off in very small lumps, which have to be withdrawn through the opening.

A steel lining also gives a dry atmosphere to a strongroom.

Concrete walls are now being attacked successfully with the Blow-pipe Flame until extremely hot, and then cold water is thrown on them, which severely fractures the concrete work. By the adoption of a steel lining, a very useful last line of defence is added to the construction, and this also prevents, or makes it impossible for the door frame to be removed as this is securely fixed to the steel lining. See Drawing No. S. 1238, page 2

SPECIFICATION

Lining is to be Chubb's Machined Rebated Steel Lining, fitted with special lugs for concrete.

The Contractor to form the concrete base, which must be perfectly level, and to properly strut in all directions the steel lining, so as to take the weight of the concrete during the pouring of the walls and roof.

TANGBAR REINFORCEMENT.

Rapid developments of scientific methods in use among modern crackesmen has made it absolutely essential that the walls, floor and roof of all strongrooms should be impregnable to all methods of attack.

In Tangbar construction, the Tangs radiate from a central spiral rod at all angles, and in all directions, avoiding any concentrated mass of metal; thus every part of the walls, floor and roof is reinforced by some section of the Tangbar, and when the concrete becomes set, the bond is particularly effective, and the interlocking of the Tangs gives the corners enormous strength.

Illustrations on Drawing S. 1238A (page) show various details of this latest security reinforcement.

The strength of any strongroom must not be gauged by the thickness of its walls, or by the stress and strain of its rod reinforcement, but by the hours of resistance which Tangbar has been designed for.

Severe tests on walls by engineers have proved that the irregular form of Tangbar offers unsurmountable obstacles to the attackers.

In many existing strongrooms, heavy steel bars are generally laid in the middle of the thickness of the walls in the form of a cage, but, with this arrangement, the concrete in front of the bars can be easily broken away without meeting any of the heavy steel bars, and when the bars are reached, can be cut with comparative ease with the blow-pipe.

SPECIFICATION.

The walls, floor and roof to be reinforced with two rows of Chubb's Patent Tangbar, which will be delivered on the site, and erected and supervised by Chubb's experts.

The Contractor is to afford any facility and assistance in placing the Tangbar in position, and to have the forming adequately braced and perfectly plumb.

(Continued on next page)

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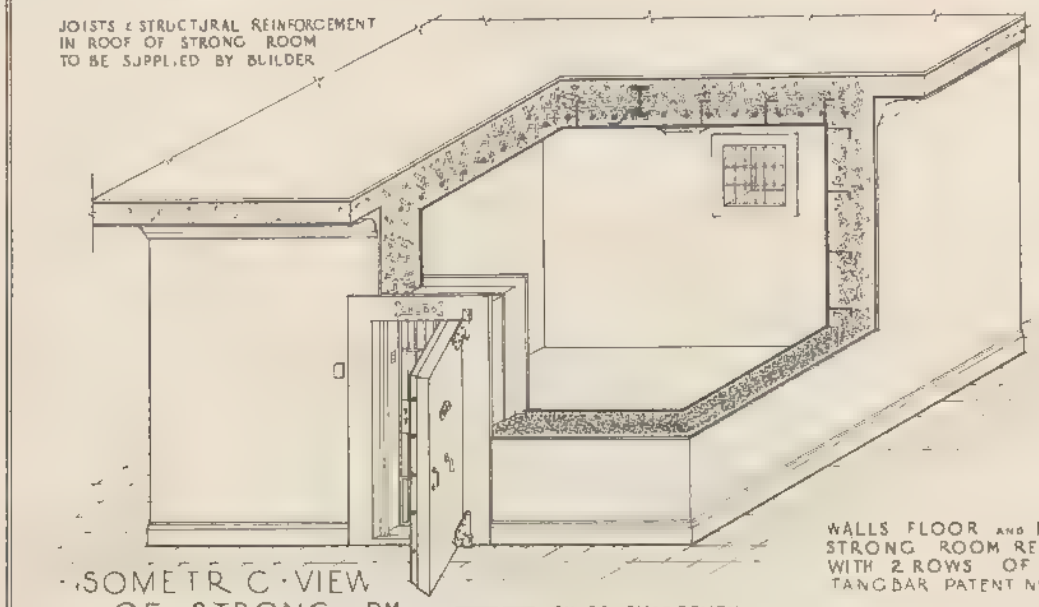
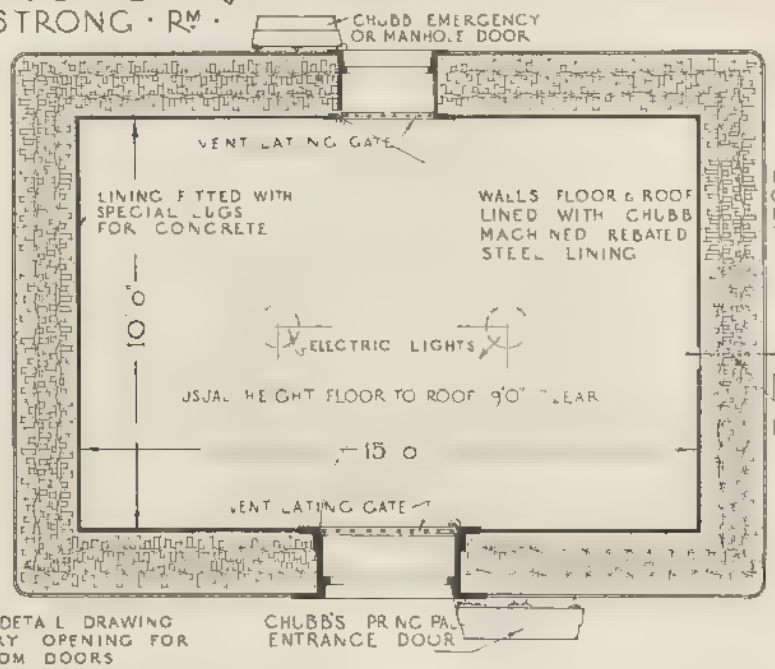


·SOMETRIC·VIEW
·OF·STRONG·RM·

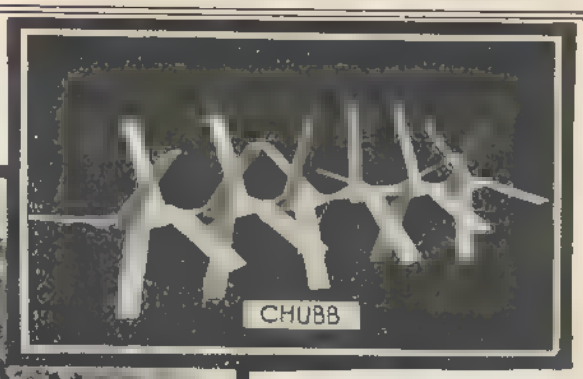


·PLAN·OF·STRONG·ROOM·

REGISTERED TRADE MARK	CHUBB'S BRANCH BANK STRONG ROOM REINFORCED WITH 2 ROWS OF CHUBB'S TANGBAR REINFORCEMENT & COMPLETE WITH STEEL LINING	DRAWING No S 1238 23RD APRIL 1931

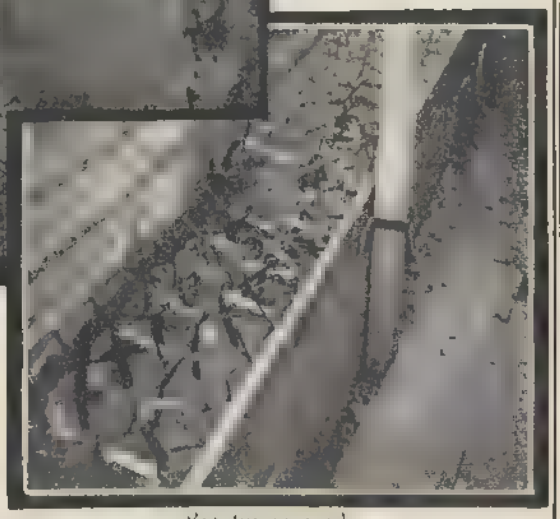
(Continued on next page)

From the collections of Sydney Living Museums / Historic Houses Trust of NSW



End view of wall, showing TANGBAR embedded in concrete.

Showing method of interlocking TANGBAR reinforcement at corners



Reinforced wall

REGISTERED TRADE MARK

CHUBB PATENT TANGBAR REINFORCEMENT FOR WALLS FLOOR & ROOF OF STRONGROOMS

DRAWING Nº S 1238A
23RD APRIL 1931.

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

15a

S.A.A. File No.

WUNDERLICH LIMITED

Manufacturers of

Architectural Metalwork

Administration: BAPTIST STREET, REDFERN, SYDNEY, N.S.W.

Showrooms and Offices:

SYDNEY: Baptist Street, Redfern.
STH. MELBOURNE: 210 Hanna Street.
ADELAIDE: Grote and Morphett Streets
PERTH, Lord and Short Streets.
BRISBANE: Amelia Street, Valley.
NEWCASTLE: Builders' Exchange, King St.
HOBART: 139 Macquarie Street
LAUNCESTON: 71 St. John Street.

[For Other Products, See Index]

Products

This classification includes a wide range of products for architectural purposes, and for use in the building industry. It comprises both stock materials and the vast variety of decorative products executed to the designs of architects or our own artists.

Stock Manufactures

Metal Letters, in Zinc, Bronze or Copper
Bronze Letters, with vitreous enamel filling
Drawn Metal Mouldings on wooden cores.
Metal Ventilators and Grilles
Bronze Tablets, Badges and Nameplates.
Plain and Decorated Coats of Arms
Metal Statuary and Fountains.
Steel Skirtings, Architraves and Rails.
Steel Doors and Trim
Awning Fascias, Crestings and Enrichments.
Bronze Mail Boxes and Letter Chutes.

Special Manufactures

General Architectural Bronzework, comprising work in Bronze, Copper, Brass, Nickel-silver, and Zinc, with natural or polished finish, or oxidised as desired, including also bronzework decorated with vitreous enamels—available in a wide range of imperishable colours. The products include:—

Wunderlich Copper Roofing to Domes, Flinders Street Railway Station, Melbourne.

Metal Roll-cap and Interlocking Roofing.
Metal Parapet Cornices; Awning Fascias
Bronze Treatment to Entrances; Bronze Doors.
Metal Spandrels under windows, Statuary Groups
Bank Fittings, Desks and Stools, Bank Grilles.
Kicking Plates; Metal Railings; Counter Screens
Monumental Bronzework; Memorial Tablets.
Commercial Nameplates; Directory Tablets.
Ecclesiastical Bronzework; Altar Rails.
Lecterns, Altar Gates; Communion Plates.
Urns and Vases; Lamp Standards and Brackets

Experience and Facilities

Since its establishment in 1887, this Wunderlich Industry has carried out successfully the most intricate undertakings of this nature, some of them of considerable magnitude, in every Australian State. Up-to-date Plants for the purpose, and a staff of trained craftsmen, are located in every Capital (see addresses above).

Designs and Estimates

Estimates will be furnished on receipt of drawings of the projected work. If desired, sketch designs will be prepared, free of charge, by the Wunderlich staff of experienced artists.

Printed Literature

Catalogues, Pamphlets and other literature relating to Wunderlich Architectural Metalwork will be sent post-free on request.

Some Works Completed Recently

Bronze Desks, Tables, Stools and Screens in the Banking Chamber; Bronze Spandrels and Pediments to three elevations—Government Savings Bank of N.S.W.; Head Office, Sydney.

Bronze Desks, Tables, Tellers' Boxes, Counter Screens; Entrance Doors and Screens, Mail Boxes and Letter Chute—Bank of N.S.W.; Head Office, Sydney.

Bronze Urn, Tablets, Cresting and Letters, decorated with Enamels—Queensland War Memorial, Brisbane

Bronze and Enamel Roll of Honour Tablets—"The Sun" Office, Sydney.

Bronze Spandrels, Pediments, Lamp Standards and Brackets—The City Hall, Brisbane.

Bronze Doors and Treatment to Doorway; Spandrels Cornice and Lettering, and Bronze Mail Box—The Atlas Building, Perth.

Synagogue Copper Domes at St. Kilda Road and at East St. Kilda, Melbourne

A.P.A. Dome; Cupolas at R.C Churches at Middle Park, Elwood, St. Kilda, Burke Road, Camberwell; Spires at St. George's Church, Fitzroy; Convent at Oakleigh, Melbourne.

Bronze Counter Screens, Commonwealth Bank of Australia, Melbourne.

(Continued on next page)

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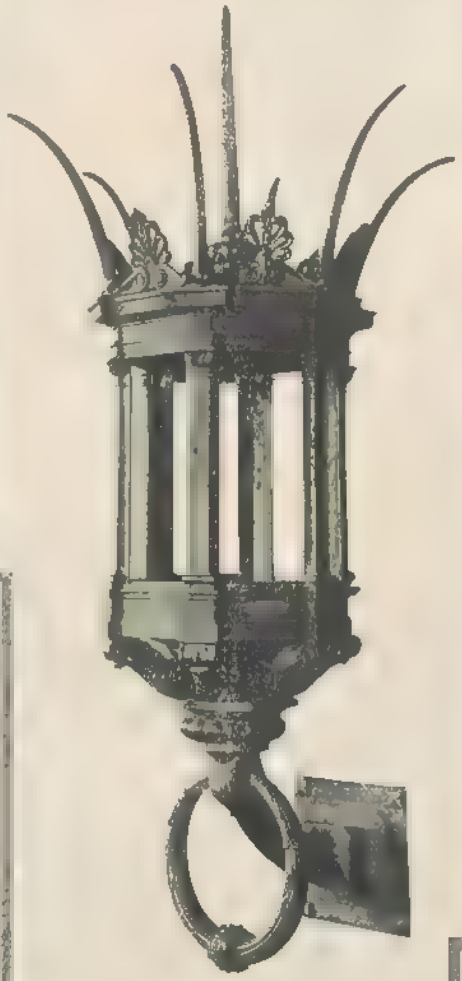
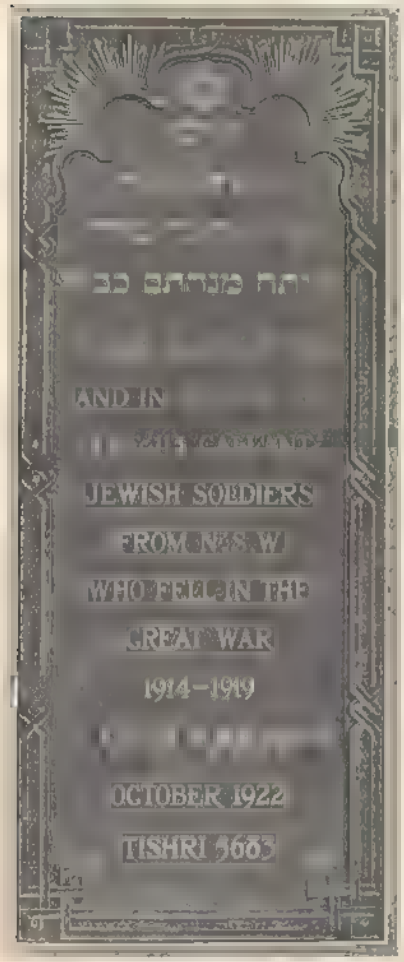
Bronze Doors, Commonwealth Bank, Sydney.



Bronze Lamp, The City Hall, Brisbane.

Copper Marquee, Farmer and Co. Ltd., Sydney.

Copper Spandrels and Mullions, Dymock's Building, Sydney.



Roll of Honour Tablet, The Great Synagogue, Sydney.

Swing Doors of Bronze, State Theatre, Sydney.

Copper Fleche, The University, Sydney

EXAMPLES OF WUNDERLICH ARCHITECTURAL METALWORK

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

19e

S.A.A. File No.

T. S. GILL & SON PTY. LTD.

672-684 CHAPEL STREET, SOUTH YARRA
MELBOURNE

ESTABLISHED 1892 GILL PHONE: WINDSOR 8000

33g

S.A.A. File No.

[For Other Products, See Index]

Products

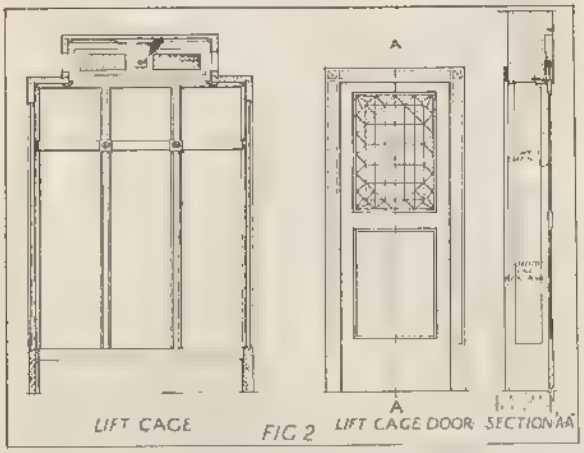
Metal faced Doors, Lift Cages and Doors, Electric Signs, Stallboard and Pavement Lights, Metal Drawn Moulding in White Copper, Brass or Bronze metal in stock patterns or to Architects' details.

LIFT CAGES

This class of work is, as far as design is concerned, purely a matter for the Architect, as also is the materials of which the cage is to be constructed, either metal or wood.

Method of Construction

Whether the interior of a lift cage is finished in either wood or metal, the carcase work will be the same, and should be constructed of ex 2 in. yellow pine, all joints being mortised, tenoned and housed. A suitable size for the framing of a lift cage is ex 5 in. x 2 in. pine. If it is desired to finish the inside in metal, our Fig. No. 2 is typical of a metal interior, but is, of course, open to innumerable variations. Panels are better if not more than 12 in. wide. These should be made of 16 or 18 gauge metal, whilst a 20-gauge metal may be regarded as heavy enough for facing the stiles and rails. Mouldings, if any, may be to detail. They may be either cast metal or metal sheathed stock mouldings, all of which should be screwed from the back and all mitres should be sweated. A ventilating frieze of pierced metal should be provided in the upper part of the roof of the cage.



PAVEMENT LIGHTS

Little detail or explanation is necessary for this work. The prisms or discs vary in size and thickness, and are set into frames of either cast iron or reinforced concrete. The prisms are double and treble tongued to make watertight.

When the necessary sizes are obtained and a concrete frame is specified, a mould is made, the spacings being such as will suit the prism to be used. The mould will be about 3 in. deep and will be reinforced with ¼-in. steel bars, wired at all intersections, concrete to be composed of 1 part fine screens to 1 part washed sand and 1 part cement. All discs or prisms are then grouted in with liquid grouting, mixed 1 part of sand to 1 of cement. When desired, the concrete may be kept ½ in. below the surface of the prism and levelled up with terrazzo or other materials that may be desired by the Architect.

Sound Construction

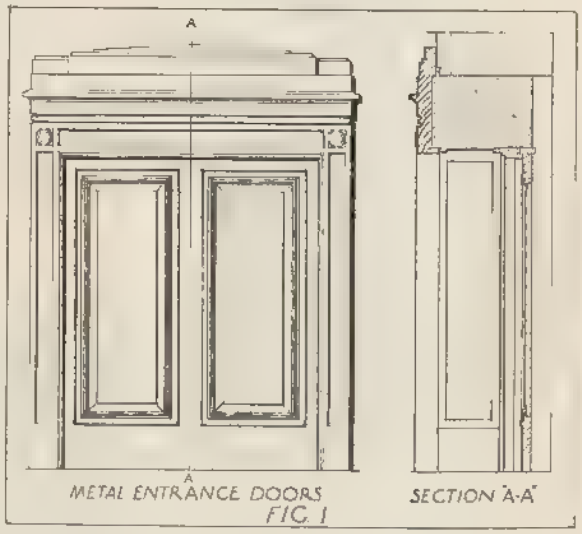
In the manufacture and construction of metal-faced doors, lift cages and doors, T. S. Gill & Son Pty. Ltd. employ methods of construction which have been developed with years of experience. These methods are briefly put forth on this page as a high standard of the requirements necessary in this work.

METAL-FACED DOORS

These are largely in use for better-class entrances—Banks, Offices and high grade Stores—and also for lift doors.

Method of Construction

Stiles should be ex 5 x 2 yellow pine, rails to Architects' detail, but the rails should be ½ in. less in thickness than the stiles, as a "flush" joint is not desirable. All sheeting should be not less than 20-gauge metal. The stiles should be "stump" mortised and all tenons should be secret wedged. The panels may be either metal or glass. Where glass is to be used, "CUPROS" is the most suitable, and when used as lift doors, the glazing must be of the fire-resisting variety, with a section of the glass left clear for observation purposes.



ELECTRIC VERANDAH SIGNS

The municipal authorities have now approved of this type of verandah sign, but confine its use to cantilever verandahs.

Method of Construction

The entire frame work consists of angle iron, braized at all joints, with iron arms to suspend sign from the verandah ceiling. The glazing is in plate glass, secured with metal (iron) beads. The wording or decoration of the glass is preferably done with the sand blast and finished in colour selected. A minimum of ten (10) 200-C.P. lights are necessary for a sign 8 ft. long.

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

STANDWELL

AUSTRALIAN METAL PRODUCTS PTY. LTD.

GENERAL OFFICE AND PLANT:
REAR NICHOLSON & SCOTCHMER STREETS
FITZROY, VICTORIA

Interstate Distributors:
SYDNEY—H. E. McClelland, 55 York Street
BRISBANE—Messrs. Bernays & Anderson, 125 Adelaide Street.
ADELAIDE—Messrs. George Wills & Co. Ltd., 31 Grenfell Street.
PERTH—Messrs. George Wills & Co. Ltd., 156 St. George's Terrace.

16b

S.A.A. File No.

[For Other Products, See Index]

Products

Hollow-Metal and Metal-Covered Doors, Swing or Sliding, and Hollow-Metal Lift Doors; Combination Steel Jambs and Architraves; Metal Lockers and Shelves; Metal Skirting.

Approved Fireproof Construction

"Standwell" Fire Doors have been approved by the Fire Underwriters' Association of Australia and the building authorities of the respective capital cities of Australia for vertical shafts such as staircase wells and lift wells.

Acceptable Design

"Standwell" doors, by virtue of their modern design, have overcome the difficulty, so often presented to the Architect, of disguising the old type of unsightly tin-clad door.

Without detracting from its fire-resisting construction, this door is highly pleasing in design—being a panelled door of 1¾in. thickness, hung in a metal frame—the whole being free from ridging or overlapping sheets presents a smooth surface which readily takes any form of finish, thus presenting a door of outstanding appearance and utility.

Construction

Door

"Standwell" Doors are constructed of 5in. wide stiles and top rail and 10in. bottom rail. Stiles and rails consist of a wood core of non-resinous, well-seasoned timber encased with a drawn metal covering of galvannealed steel sheets (rust resisting), flanged in such a way as to meet together on the inside of all stiles and rails. The junction of the wood cores at the stiles and rails are grooved both sides, into which the metal covering is ingeniously entered to form interlocking joints. These joints are lead-filled and cleaned off smooth by a finishing process.

Each panel consists of two sheets of galvannealed steel with asbestos sheet core between and formed in such a way as to come flat together at flanges of stile and rail. The whole is spot welded together at intervals, thus hermetically sealing the wood core in the metal casing.

The panel mould, being of an attractive design, gives a finish to a distinctive door.

Frame

Each door is hung in a pressed steel combination jamb and architrave of 18 gauge metal These frames can be designed to suit any condition of opening. A feature of the single-door installation is that the two-point contact and self-closing equipment is embodied in the frame, thus eliminating fittings on the face of the door.

Standwell Doors in the Commercial Banking Co. of Sydney

Erection

Erection is simplified. Door and frame, designed as a unit, is made and hung in the workshop. Building in of the frame as the work proceeds is desirable; it not only makes for a solid and better fixed job, but a saving of time in building construction. Any damaging of walls or plaster after erection is avoided.

Swing Door

Each swing door is hung in the frame with a pair of 4 inch half-surface ball bearing hinges fixed to jamb, with metal stove screws on one half and the other bolted through door. The ease of operation of the doors on these hinges is a feature of the installation.

Sliding Door

Sliding doors are top hung to ball-bearing roller pendants running on a special section drawn metal track. A feature of the sliding door is the interlocking joint between door and frame at head and back of door which operates when door is closed.

All doors close smoothly and sweetly. No metallic banging. Simplicity of operation.

Finish

Any kind of finish can be obtained, such as lacquer or grained enamel to colours as desired. The quality of metal used lends itself to the highest degree of finish possible.

(Continued on next page)

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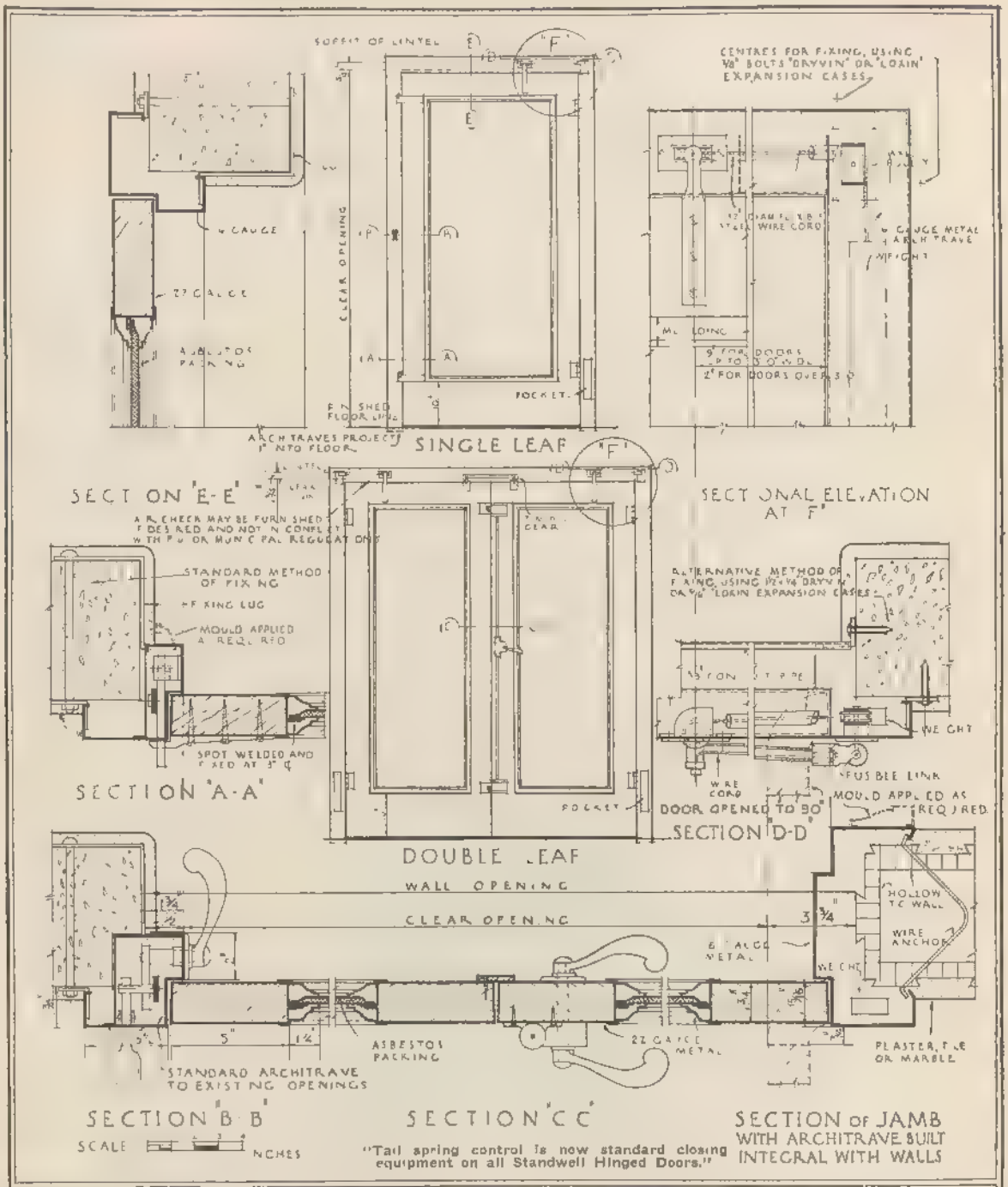

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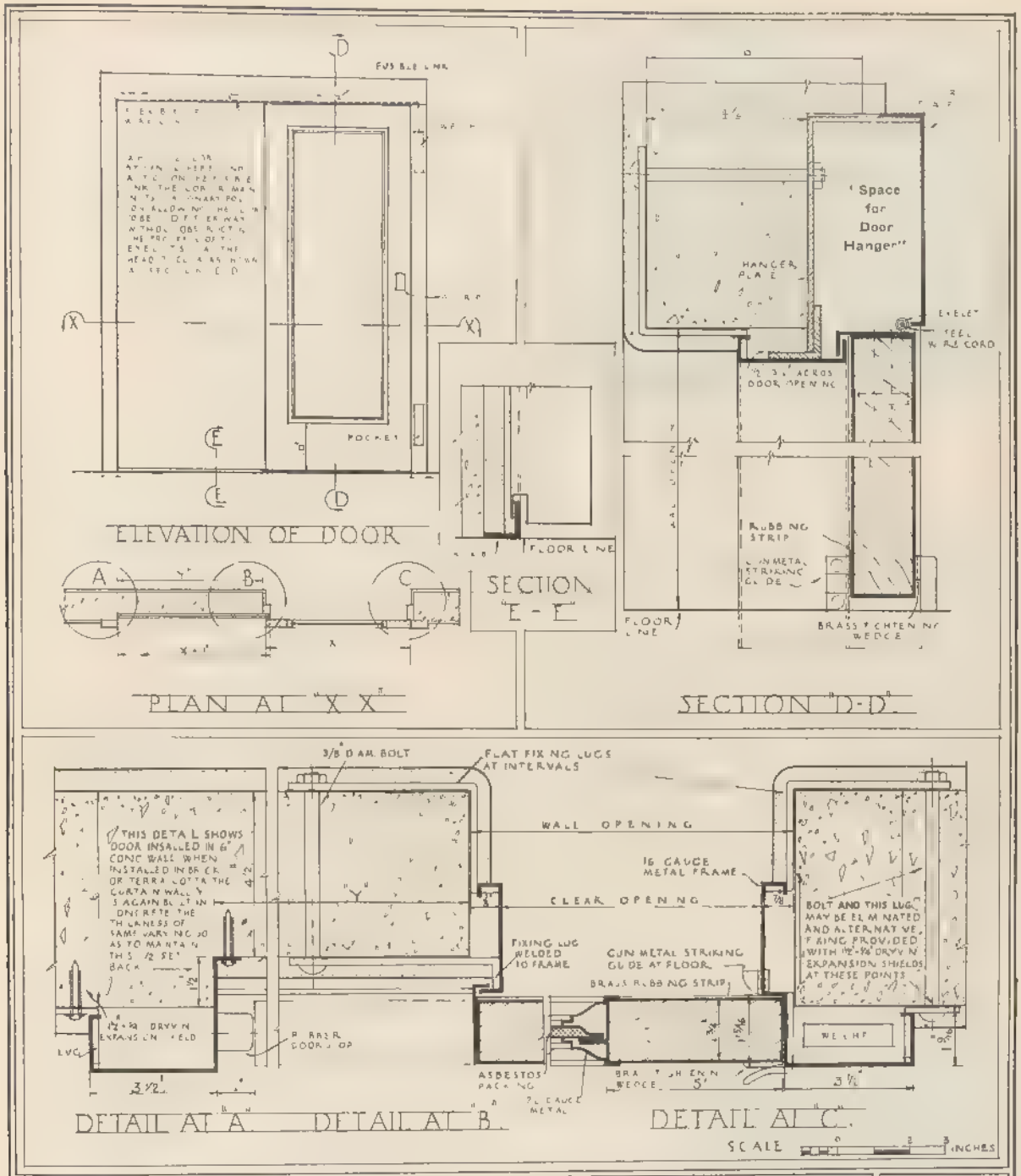


"STANDWELL" FIRE DOORS	DETAILS OF THE EQUIPMENT AND THE INSTALLATION OF "STANDWELL" AUTOMATIC SLIDING FIRE DOORS	DRAWING No. 3 24TH SEPT. 1930.

(Continued on next page)

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

Standwell Sliding Doors in the T. & G. Building, Sydney.

STANDWELL DOOR INSTALLATIONS

Commercial Banking Co. of Sydney, Melbourne
Architects. Bates, Smart and McCutcheon

Bank of Australasia, Melbourne.
Architects: A. & K. Henderson

A M P. Building, Melbourne.
Architects· Bates, Smart and McCutcheon

Julius Kayser Building, Richmond, Victoria.
Architect: J Plottell.

Richmond Terminal Station, Victoria.
Architects· State Electricity Commission.

Dominion House, Melbourne.
Architects· Hare, Alder, Peck and Lacy.

Equity Trustees Building, Melbourne
Architects Oakley & Parkes

G. J. Coles, Melbourne.
Architect: H. A. Norris

State Electricity Commission Building, Flinders Lane

T. & G. Building, Sydney.
Architects: A. & K. Henderson

ARCHITECT'S SPECIFICATION

GENERAL

All Fire Doors where indicated on plan (or as per Schedule below ..... or .. .... describe location) shall be "Standwell" swinging and/or sliding doors hung in pressed steel jambs and built in as the work proceeds, the whole construction being in accordance with the F.U. Association standards.

DOOR CONSTRUCTION

Door stiles and rails shall be 1¾ in. thick, constructed of a wood core of non-resinous well-seasoned and truly milled timber, metal covered with 22 gauge galvannealed steel, rust-resisting sheets, spot welded to panels consisting of galvannealed sheets with asbestos core. Form interlocking joints at junction of stile and rails, all lead-filled. Panels shall be finished all around with metal mould of standard design.

FRAMES

Frames shall be of one piece, combination plain (or moulded) jamb and architrave, embodying all self-closing and locking equipment. Each swing door shall be hung with a pair of 4-inch half-surface, ball-bearing hinges.

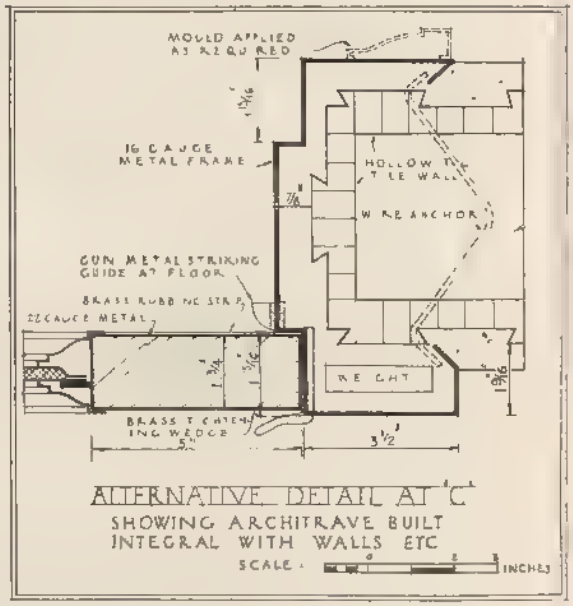
Each sliding door shall be top hung to ball-bearing roller pendants running on a special section track.

FINISH

Frames and doors shall be delivered on the job shop-painted in one good coat of priming to take lacquer or paint finishes as specified later.

BUILDING IN

Frames shall be solidly built in as the work proceeds by the General Contractor, who shall take all responsibility for the true setting of the frames in the wall.

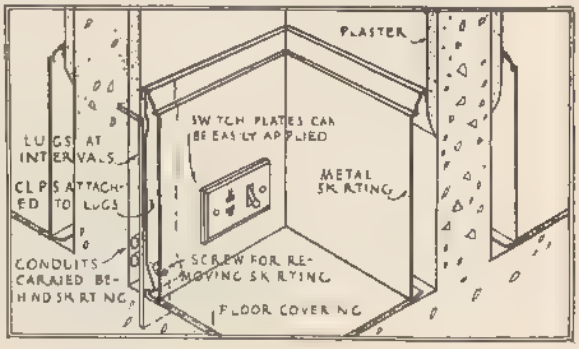


METAL SKIRTING

Metal skirting, in conjunction with metal jambs and architraves, gives a continuous metal installation irrespective of whether wooden or metal doors are used, in effect that metal to metal contacts are made.

The method of fixing metal skirting is by means of spring clips fixed to brackets at intervals (see illustration). Behind these brackets accommodation is provided for electrical conduits, etc.—the method of clipping makes them easily accessible.

With a lacquer finish, rich effects can be obtained, in addition to giving the material an impervious surface Skirtings can be made to any size or shape



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HOLLOW STEEL COMBINATION JAMB AND ARCHITRAVE

Description

The combination of door jambs and architraves fabricated in hollow steel sections, provide a building unit acceptable to architects who seek a fire-proof material yet withal architecturally correct in design

The unit submitted by us is strongly constructed with all mitres welded, thus overcoming the difficulties of sagging and shrinking so often found in wood constructions.

Construction

The construction of the unit is as follows:—

1. The side jambs are coped to the heads with mortise and tenon attachments, thus insuring proper alignment and accurate dimensions.

2. The casing sections are accurately mitred and acetylene welded on the reverse side, producing neat, concealed and permanent joints.

3. The jambs are mortised, reinforced drilled and tapped for hardware at the factory, giving machine accuracy and eliminating costly field labour.

4. No. 16 gauge, cold-rolled with the rolling process, produces clear-cut, sharp profiles, true and accurate to detail. Wire anchors make the frames a component part of the wall structure.

Additional Advantages

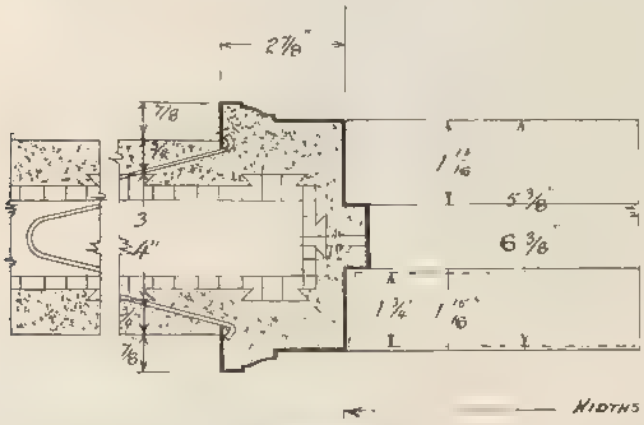
The unit, when built in with the walls, displaces lintels a saving in itself Actual tests have shown that 16 gauge rolled-steel section will sustain all terra cotta wall loads without deflection for openings up to 5 ft. wide. Wider openings are reinforced in head with 14 gauge channels as shown, having 2½ in. flanges. These are good for openings up to 8 ft. wide.

Stock Sizes

For 3-in. and 4-in. Partition Walls.

Jamb Openings—

6ft. 6in. high x 2ft. 6in. wide
6ft. 8in. high x 2ft. 8in. wide
6ft. 10in. high x 2ft. 10in. wide
7ft. 0in. high x 3ft. 10in. wide



METAL LOCKERS

The low initial cost of metal lockers combined with their ability to stand up to rough usage make them a most economical proposition.

Our metal lockers are made of 20-gauge steel sheets, with doors of 16-gauge; this ensures a strong and rigid construction. Doors can be made with overlapping edge at slight extra cost; this obviates the open joint and is a distinct advantage.

Standard ventilation to lockers is by louvres pressed in the door face, but perforated doors can be supplied to various designs if required.

Single type lockers are equipped with hat shelf and three coat hooks. The method of locking is by a three-point espagnolette bolt fitting and lock (master-keyed).

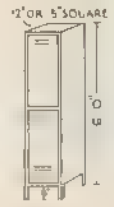
Double type lockers are the same as single type, but with the hat shelf omitted

Standard finish is in Olive Green Enamel, baked on

Standard Sizes—

Single Type—	6ft. x 12in. x 12in.	
	6ft x 15in. x 15.n	
Double Type	6ft. x 12in. x 12in.	
	6ft. x 15in. x 15in.	

Single Type.



Double Type.

Type of Metal Lockers Installed in the New A.M.P. Building, Melbourne.

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28a

S.A.A. File No.

WORMALD BROS. LIMITED

FIRE PROTECTION ENGINEERS
SINCE 1889

CITY OFFICE: 19 BLIGH ST., SYDNEY. FACTORY: YOUNG ST., WATERLOO, SYDNEY

BRANCHES:
MELBOURNE—180 Bay St., Port Melbourne. BRISBANE—"City Buildings," Edwards St.
NEW ZEALAND—"T. & G." Buildings, Wellington. ADELAIDE—Bowden.
PERTH—Wellington St.

[For Other Products, See Index]

"STEELBILT" STEEL STORAGE PRODUCTS

Advantages of Steel

"STEELBILT" All Steel Products include such items as adjustable shelving, lockers, cupboards, filing cabinets, stock bins, etc., and are now very moderate in price. They cannot burn; are stronger and cleaner than wood, and they will not rot nor chip.

Standard Lockers

Standard Lockers are made in four different tiers, as shown in the accompanying illustration. The first is a full tier clothes locker with hat shelf and both centre and side hooks. This is a dustproof, neat executive wardrobe for office use, which gives good ventilation. The next is a well-ventilated locker giving two individual coat and hat lockers, which are ideal for office staff use where space will not permit each member having a full tier. The other two tiers show four and six lockers, respectively. These are of great benefit for factory staffs and schools, etc., and each locker has two individual keys. The illustration only shows one type of door. Other fronts can be had with wire mesh or perforated steel. This latter has been very successfully used in a number of Golf Clubs where "Steelbilt" has bene installed.

Steelbilt Standard Shelving in Actual Use

Standard Shelving

Standard "STEELBILT" steel shelving is available in many different forms, and can be taken from stock without delay or extra expense. Every part matches up, and so can be added at will as the requirements of your business extend.

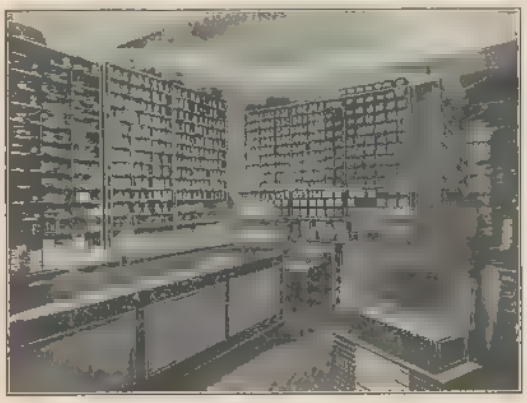
Skeleton shelving as shown here can be built up to a composite arrangement of cupboards, bins and racks just by the addition of standard parts as needed, and extra shelves and dividers can be put in when needed.

"STEELBILT" shelving can be altered with speed and cleanliness which is utterly impossible with carpentering. This is a big advantage.

Locker Sizes and Construction

Standard Lockers are made in tiers, 6 ft. high x 15 in. x 15 in., with extra strong legs made of 14-gauge steel. They are all equipped with 3-way locking device operated by flat key (in duplicate). Every lock is different. The hinges are specially constructed so that no bolt or screw appears on front of door. This makes them particularly neat.

Showing the neat adaptability of adjustable shelving for Motor Parts Storage.



Strength

"Steelbilt" Shelving is much stronger than wood, for, though only comparatively light, great strength is given. On a reinforced shelf, 24 in. x [illegible] in., up to 650 lbs weight has been carried, with the front flange showing only ¼-in deflection.

Adjustments

"Steelbilt" Shelving adjustments enable every inch of waste space to be utilised, and, because of the comparative smallness of the components, it is estimated that 33 per cent. more storage space is possible than with wood. Every shelf can be moved up or down with 3-inch adjustments, by simply unscrewing a bolt at the two front corners and lifting off the special hook at the back.

A group of "STEELBILT" lockers showing various standard arrangements. From the full tier to the 6 locker tier.

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STEEL WINDOWS

C. DOWELL & SONS PTY. LTD.

General Office and Plant:
REAR NICHOLSON AND SCOTCHMER STREETS,
FITZROY, VICTORIA.

Interstate Distributors:

SYDNEY – The Austral Roller Shutter Works Ltd., 96 Harris Street, Pyrmont.

BRISBANE—Messrs. Bernays & Anderson, 125 Adelaide Street.

ADELAIDE—Messrs George Wills & Co. Ltd., 31 Grenfell Street.

PERTH—Messrs. George Wills & Co. Ltd., 156 St. George's Terrace.

16e

S.A.A. File No.

Products

Dowell Cottage Casement Windows; Metal Lift Fronts and Enclosures; Lift Doors and Lift Car Superstructures; Wrought-Iron Balustrades and Grilles; Collapsible Gates, Burglar Grille Bars; Dowell Solid Rolled Double Weathered Steel Casements Dowell Industrial Steel Sash.

(See the following three pages for Windows.)

Equipment and Facilities

Our equipment consists of a completely-equipped establishment devoted to the production of the above products. Facilities include designing, drafting, engineering and estimating departments, and a fully-equipped foundry, machine shop and finishing department. This organisation is thus able to offer to the architect a complete service covering the production of metal products.

Ornamental Ironwork, etc.

In the fabrication of wrought iron balustrades, gates, grilles, etc., nothing but wrought iron of a tough, fibrous and uniform character is used. The iron is forged and smoothly finished, and, wherever welded or riveted, the joints are clean and accurately fitted.

Long experience in all classes of wrought iron work has developed a high standard of workmanship. One of our many successful jobs—the Ornamental Gates to the additions of the Victorian State Savings Bank—is shown. Estimates, designs and co-operation will be given gladly.

Lift Enclosures and Cars

Lift fronts and enclosures being generally at the point of entrance to a building, it is most necessary that a design and finish in accordance with the importance and standing of the building be installed.

Our experience enables us to produce any kind of lift enclosure in metal. We make enclosures of steel diamond and square mesh and hollow steel construction with polished wire, glass or steel panels, in any desired finish.

We build all parts comprising the construction of entrances and lift cars, including all necessary mechanism and hardware. This results in proper operation and undivided responsibility. Lift cars are of all fireproof construction, consisting of pressed steel finished in a wide range of finishes, including baked enamels, lacquer and imitation wood graining. They can be constructed to suit lift shafts in new or existing buildings. We are prepared to submit our designs or work off those submitted to us.

(Above) — Ornamental Iron Gates by C. Dowell & Sons Pty. Ltd., in State Savings Bank, Melbourne.

Architects, Stephenson & Meldrum.

T. & G. Building, Melbourne, in which Dowell Steel Casements were installed throughout.

Architects: A. & K. Henderson.

Metal Lift Enclosure, Melbourne Town Hall.

A typical example of the work of C. Dowell & Sons Pty. Ltd.

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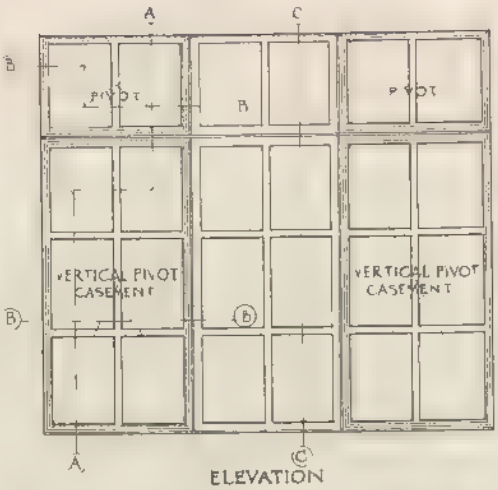
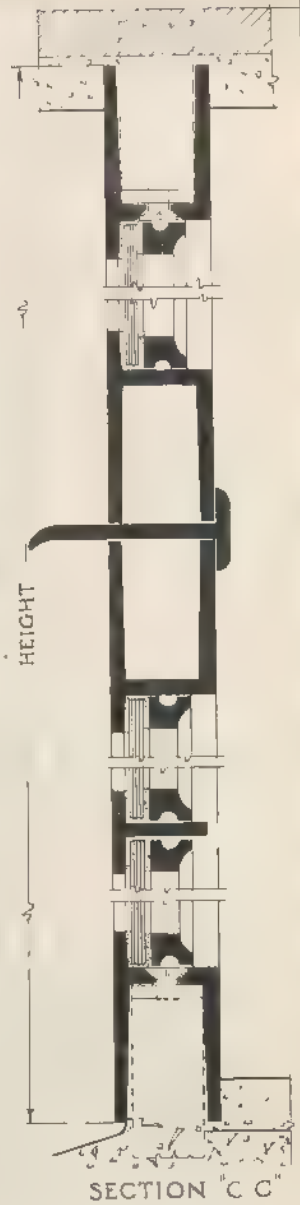




DOWELL STEEL CASEMENTS

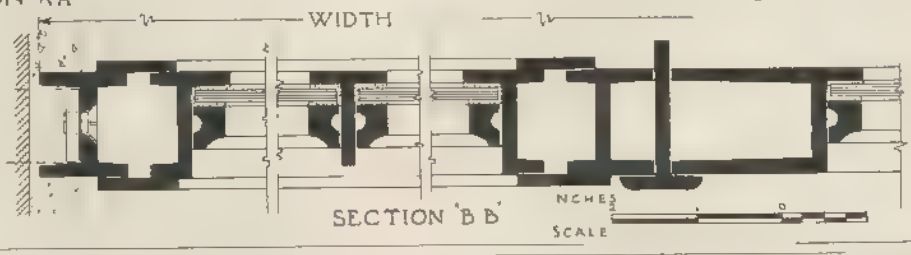
These Casements are made of our standard 1⅜-inch section. A special feature of this section is its double weathering obtained in the rolled section giving two point contact—an essential in metal window construction. No screwed flats are necessary with their consequent evil of corrosion between the screwed members. They can be built up with transom and mullion bars to form composite windows with the distinctive character of a transomed and mullioned window. These windows are specially recommended, for they ensure sight lines being even, and glass panels on the same plane.

Dowell Steel Casements are made in standard opening arrangements as follows:—

1. Side hinged, opening in or out.
2. Top hung, opening out.
3. Bottom hung, opening in.
4. Vertically pivoted.
5. Horizontally pivoted.

RECOMMENDED MAXIMUM SIZES TO OPENING SASHES.

	Width not to exceed	Height.
Side hung	2ft. 9in.	6ft. 6in.
Top hung or bottom hung	5ft.	3ft.
Vertically pivoted	3ft. 6in.	6ft. 6in.
Horizontally pivoted	5ft.	4ft.



C. DOWELL & SONS PTY. LTD. METAL WINDOWS

DOWELL'S METAL CASEMENTS

DRAWING No 1. 23 APRIL '31.

(Continued on next page)

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ARCHITECTS SPECIFICATION FOR DOWELL STEEL CASEMENTS

FRAMES AND SASHES.

All windows as shown on drawings shall be of the Dowell type of solid rolled double-weathered sections of at least 1⅝in. deep. No screwed facings shall be allowed. Bars shall be hydraulically straightened and have corner accurately machined and electrically welded, and shall be cleaned perfectly smooth and square. All sight lines shall be even, and glass on the one plane. Transome and mullions shall be formed where necessary (or as shown on drawings) to obtain this arrangement. Glazing bars shall be of 1in. x ⅛in. tee sections (or as required by the Fire Underwriters' Association), tenoned and riveted to outer framing; where intersections occur they shall be formed by a method of overlapping interlocking joint. Glass shall be secured with the moulded metal beading accurately mitred at the corners.

FITTINGS.

All fittings (hinges, fasteners, stays, cleats, latches, etc.) shall be of solid bronze (or gunmetal)

PAINTING.

Windows shall be thoroughly cleaned of rust and scale and painted with two coats of rust-resisting paint before delivery.

BUILDING IN

General contractor shall be responsible for the proper setting and building in of the frames and the application of hardware as required. All opening sashes shall be left in proper working order.

Note: Unless otherwise specified, all glass shall be provided or under another contract and secured by general contractor. Pins for putty glazing are supplied by us

DOWELL INDUSTRIAL WINDOWS

Description

The Sashes are made of 1in. x ⅛in. tee sections, and the frames are generally of a heavier channelled section, which serves as a key for cement pointing. Two or more units of the sash may be coupled together by means of our standard mullions and transomes

GLAZING SIZES.—With the exception of smaller sizes in opening sashes, glass sizes have been standardised to suit 18 x 18 in

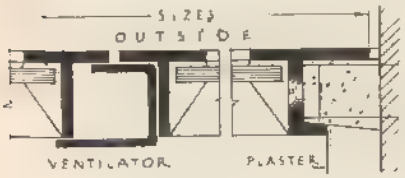
FRAMES.—All corners of the frame are welded, and glazing bars are tenoned and riveted; intersections are formed by the method of interlocking overlapping joints

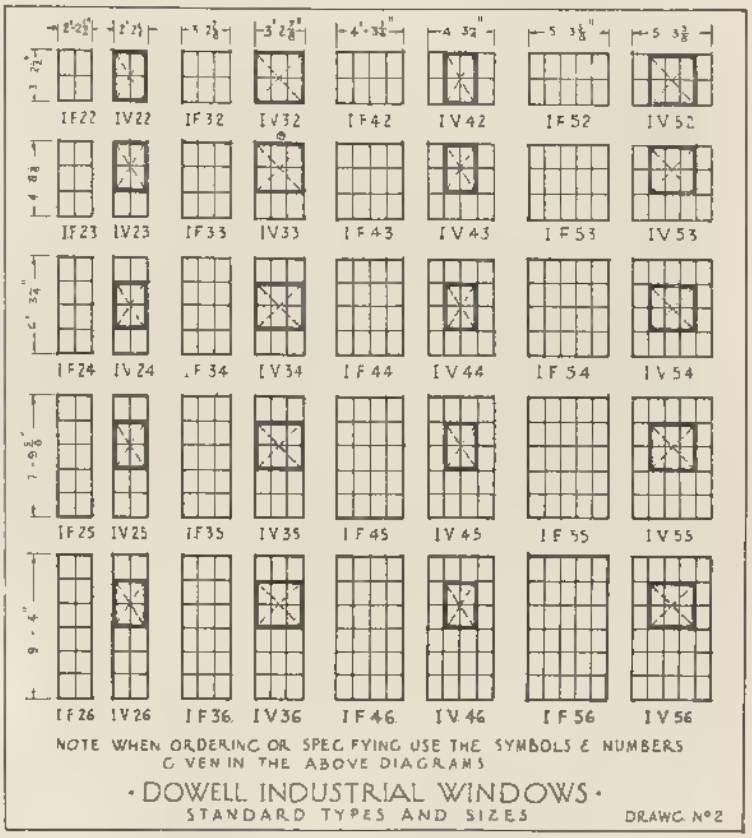
SASHES are made of 1 x ⅛in. tee sections, mitred at corners, glazing bars are of the same section. Around the outside a channel section is supplied, giving two-point contact between sash and frame.

HINGES.—Sashes are horizontally hung on steel pins turning in bronze bearings These are adjustable so that they take up any slight discrepancies that may occur in erection.

FITTINGS.—Bronze spring-catch fastener with cord and cleat is the method of operating sashes.

FINISH All work is given one primary coat of rust-resisting paint before delivery





DOWELL STEEL RESIDENTIAL WINDOWS (COTTAGE TYPE)

Designed in convenient sizes to meet all requirements and with opening sashes as shown on the following page, they form an economic proposition within the scope of any prospective home builder They are as cheap as wooden windows but give that characteristic simplicity of line which is only obtainable by the use of steel.

The opening sashes are not large and cumbersome, but are large enough to give all the desired ventilation required. Broken up into small panels of glass with light glazing bars they form a very rigid sash The section of frame and sash used is 1 in. deep x ⅛ in. web, with glazing bars of 1 in. x ⅛ in tees. All corners of frames and sashes are welded, and glazing bar are tenoned and riveted to outer framing Intersections of glazing bars are formed by the method of overlapping interlocking joints

Sashes are hung on surface hinges with steel pins turning in gunmetal bearings. When required, projecting hinges can be supplied for easy cleaning from inside. Hinges and brackets to receive fittings are riveted to the sash and the frame Casement stays and fasteners are of gunmetal. All glazing is done from the outside. All work receives one coat of rust-resisting paint before delivery

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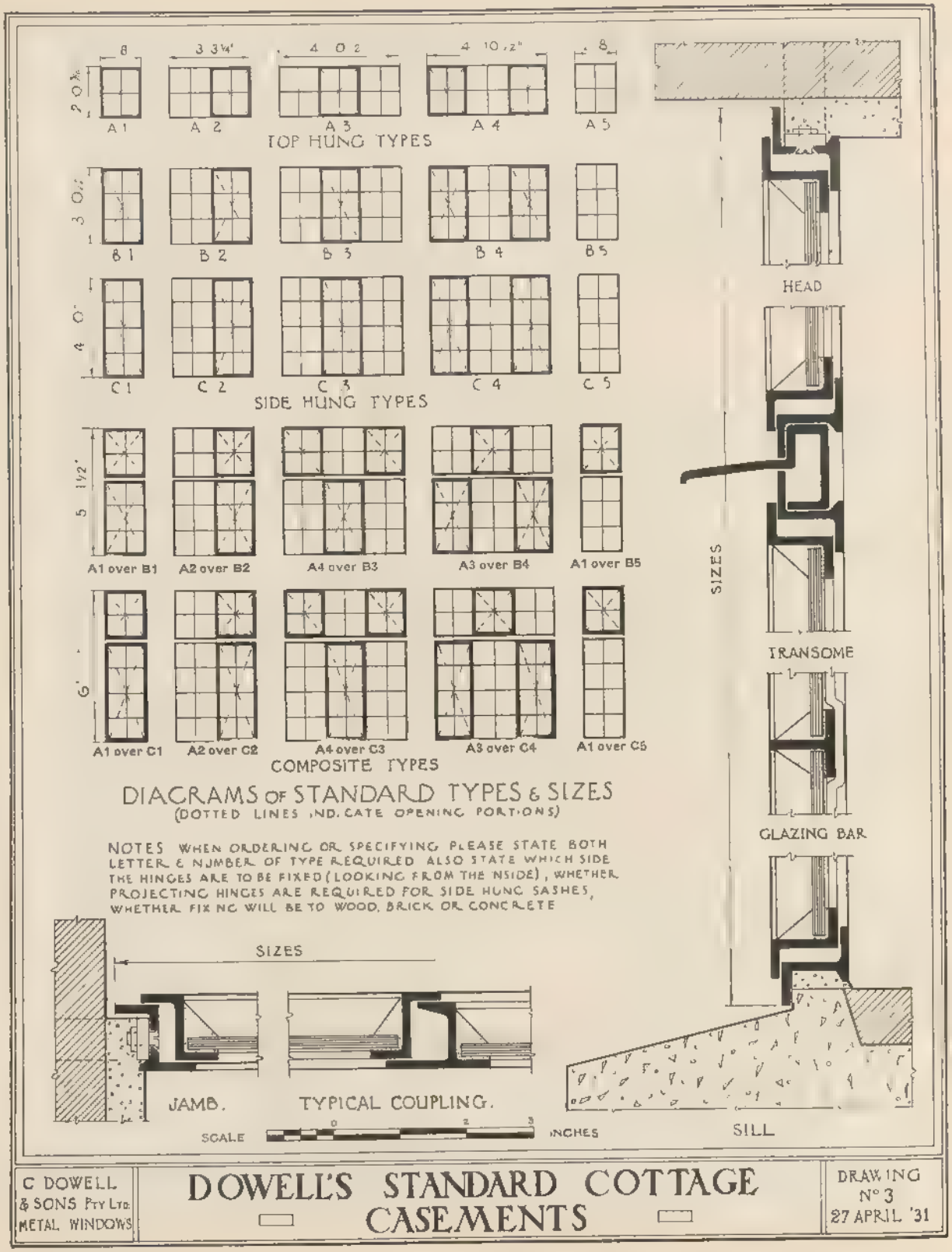

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INTERSTATE REPRESENTATIVES

N.S.W.—Sydney Ornamental Steel Co. Ltd., 38 Wells Street, Redfern, Sydney.

S.A.—W. G. Kirkland, B.Sc., A.M.I.E. of Aust., Ridge Avenue, Glen Osmond, Adelaide.

W.A.—A. E. Builder & Co. Ltd 56 A.M.P. Building St George's Terrace, Perth.

(Continued on next page)

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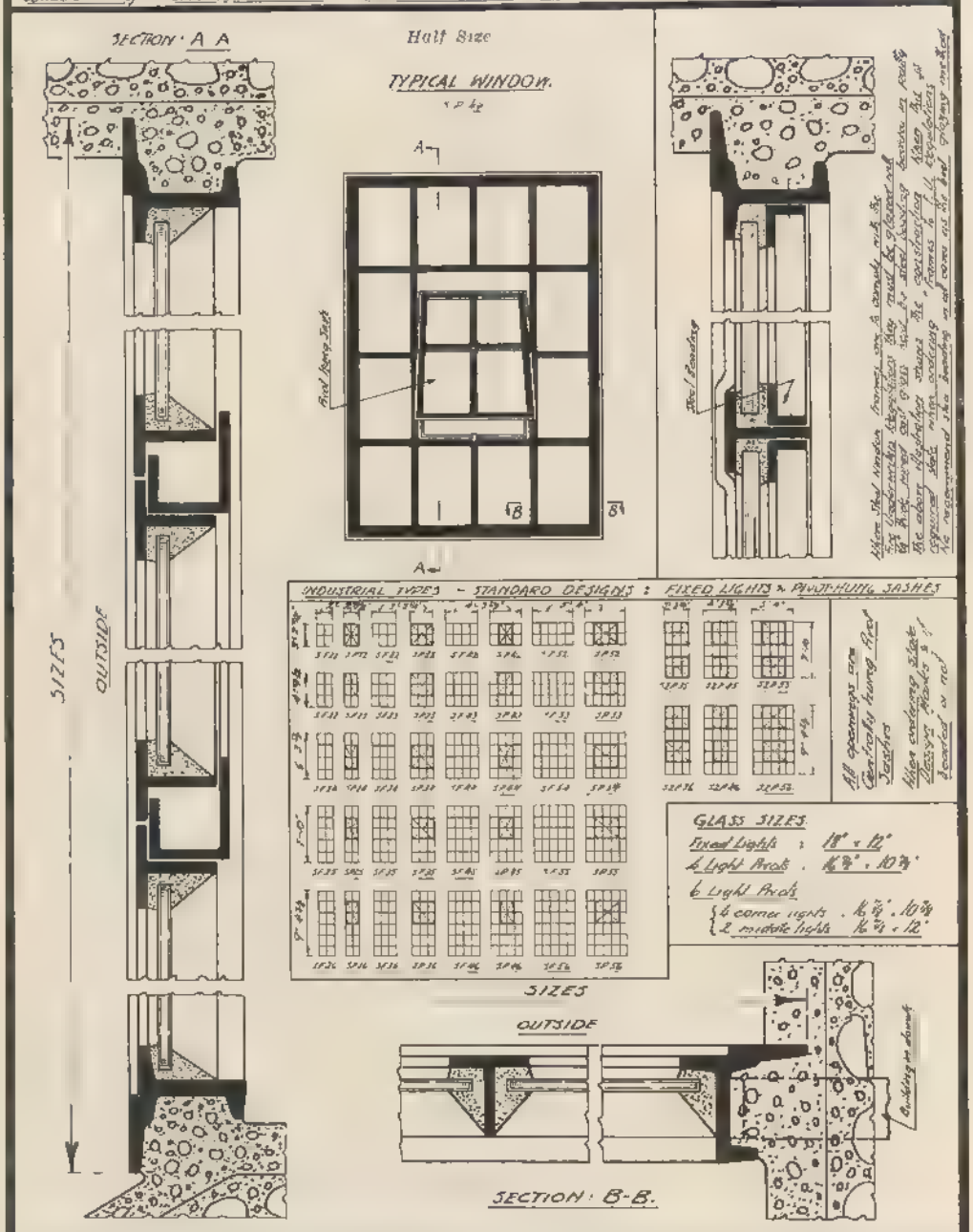
GAMLIN & METES PTY. LTD.
Manufacturers and Engineers

OFFICE & WORKS.
501 RAE STREET Nth. FITZROY. N.7
MELBOURNE VIC Telephone J W. 4222.

STEEL WINDOW FRAMES – INDUSTRIAL TYPES: CLASS. B.

The Industrial Types of Steel Window Frames are suitable for Factories Warehouses Garages Workshops & Industrial & Rural Buildings generally They are of strong & rigid construction, weatherproof & indestructible Constructed from solidly drawn, double heat treated mild steel bars Corner welded & ground Fittings bars machined tenoned & riveted Intersections of lock-bar interlacing types. Delivered complete with strong suitable fittings building in dowells & painted one coat of anti corrosive paint. Glass is not supplied by us.



STANDARDISATION means ECONOMY
Adopt Standard Designs
Reduce Number of Types
to a minimum

FOR OTHER NON-STANDARD DESIGNS, ALSO OPENINGS TO SUIT FACTORY ACTS SEE. W102

Ordinary washers easily rust and set hard as steel. If special steel window frame bolts are not available we recommend: Add 6 to 8 oz. of pure linseed oil to 14 pounds of grade size white lead use fresh after mixing

INTERSTATE REPRESENTATIVES

N.S.W.—Sydney Ornamental Steel Co. Ltd., 38 Wells Street, Redfern, Sydney.

S.A.—W. G. Kirkland, B.Sc., A.M.I.E. of Aust., Ridge Avenue, Glen Osmond. Adelaide.

W.A.—A. E. Builder & Co. Ltd 66 A.M.P. Building St. George's Terrace Perth.

(Continued on next page)

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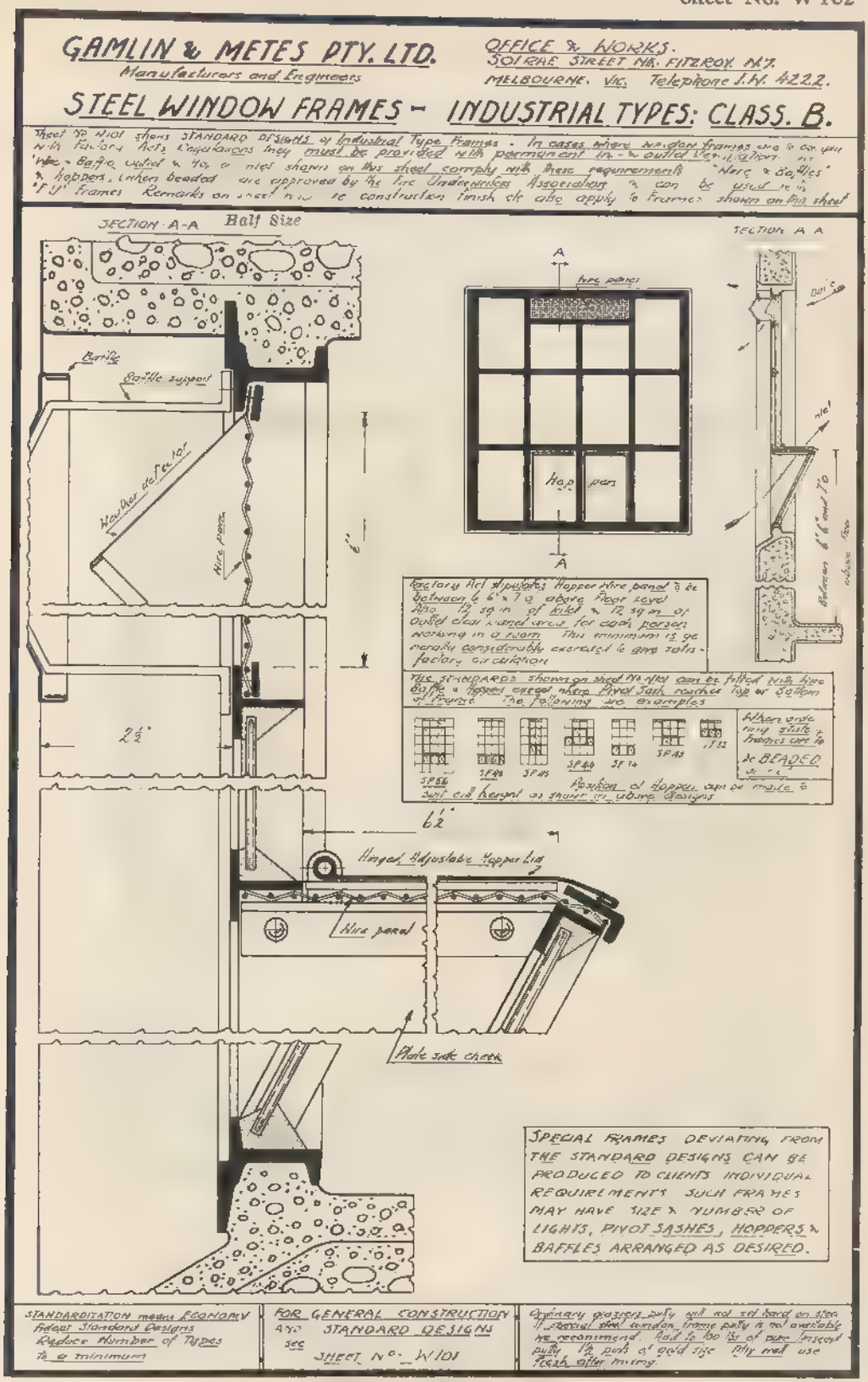

N.S.W. Sydney Ornamental Steel Co. Ltd., 38 Wells Street, Redfern Sydney

INTERSTATE REPRESENTATIVES
S.A.—W. G. Kirkland, B.Sc. A.M.I.E. of Aust., Ridge Avenue, Glen Osmond Adelaide.

W.A.—A. E. Builder & Co. Ltd. 56 A.M.P. Building, St. George's Terrace. Perth

(Continued on next page)

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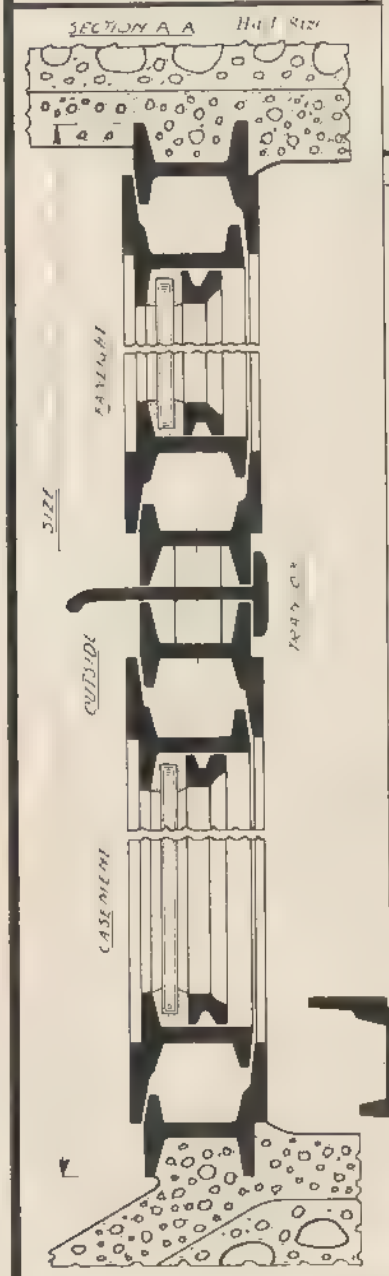
Manufacturers and Engineers.

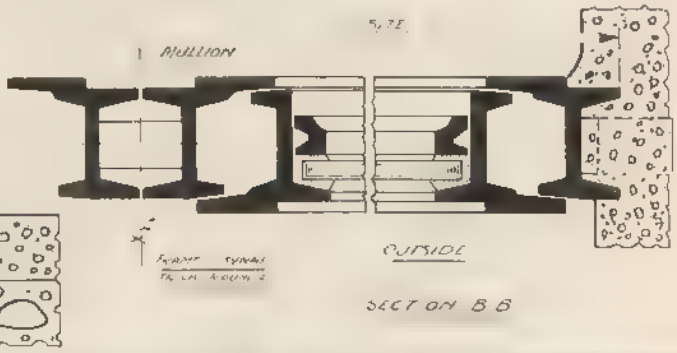
OFFICE & WORKS
301 RAE STREET NR. FITZROY N.7.
MELBOURNE VIC Telephone J.W. 4222

STEEL WINDOW FRAMES – CIVIC TYPES: CLASS C.

Civic types are adopted by Government buildings, Banks, Insurance & Commercial Offices, & generally wherever the highest excellence of Steel window frame & construction is called for. These frames embody the latest development in design & production & finish. They are [illegible] by our [illegible] & reasonable methods for the [illegible] of a perfect mitre corners giving a clean sight line & carrying round finished PH bar sections [illegible] in ample proportions with double weathered cills. Faces the opening sash for this class are made [illegible] as [illegible] for a [illegible] casement, projected sashes for [illegible] & horizontally pivoted [illegible]. The above the projecting sash & [illegible] sash carry with [illegible] illustrations & [illegible] tions we suggest metal beads in all cases [illegible] the best glazing method. All fittings are heavy [illegible] metal.



DESIGN SUGGESTION CASEMENT & FANLIGHT



Standardization means economy. Adopt standard sizes & reduce number of sizes to a minimum.

For further design suggestions see Civic Types Sheet No. W 104

A safeguard against abuse & ensure safe use. Steel frames must be handled & fixed in the job fixed & afterwards with reference, check to instructions covering these matters should be specified.

(Continued on next page)

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Manufacturers and Engineers.
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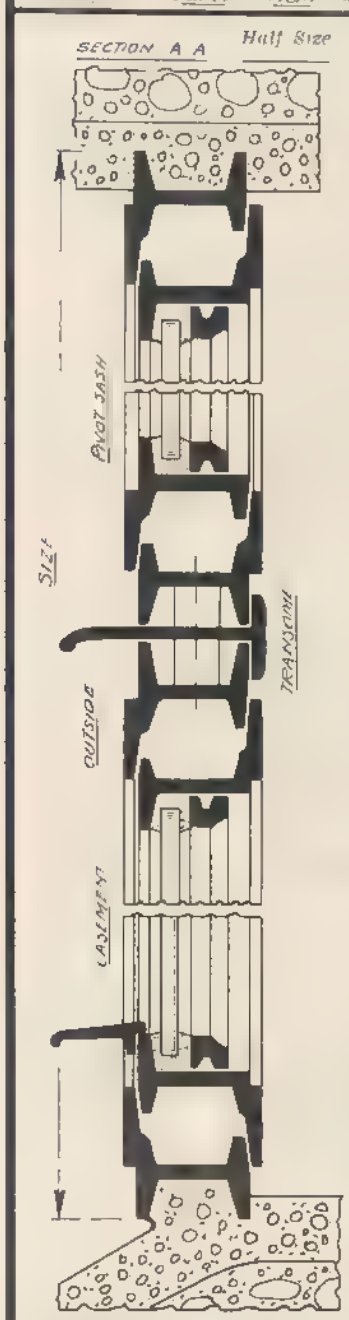
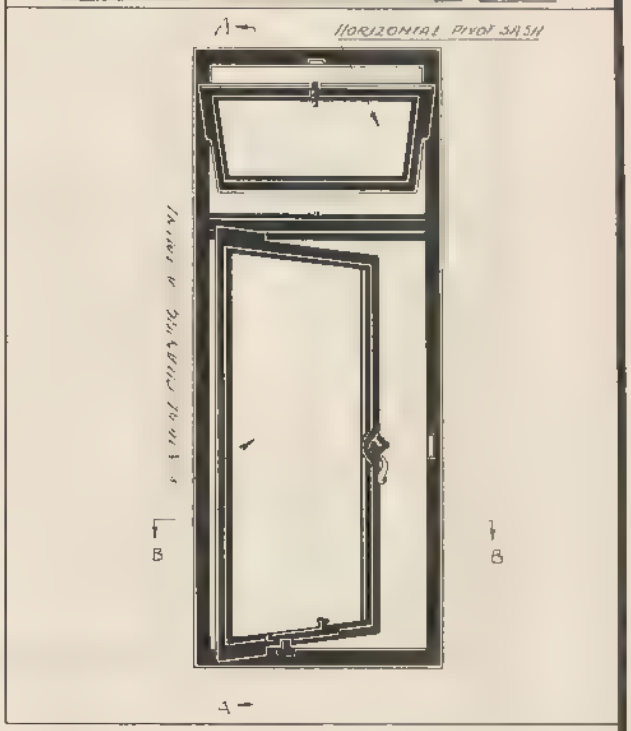
MELBOURNE VIC Telephone J.W. 4222

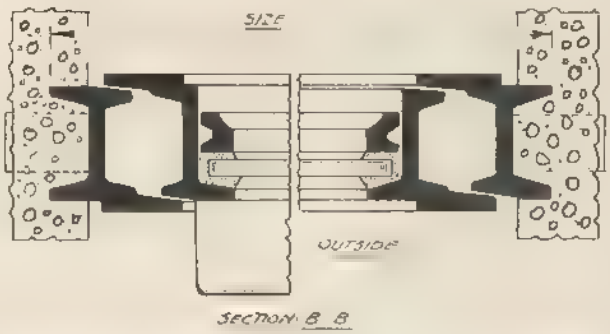
STEEL WINDOW FRAMES – CIVIC TYPES: CLASS C.

General Notes re Construction & Openings for CIVIC TYPES are shown on Sheet No W103. The "Design Suggestion" on Sheet No W104 presents a Horizontally Hung Pivot Sash combined with a Vertical Cleaning Casement. These Casements are provided sufficient distance from the side to leave a space wher[illegible] between the outer frame & casement [illegible] possible to effect the cleaning of the outer face of the [illegible] from the inside of the room. The pivots are of special design having large dimensioned bearing surfaces thereby ensuring minimum friction & effort in operation coupled with close & exact fitting without any looseness or rattling. All fittings are of heavy, dignified design finished in polished gun metal. We do not supply Glass.



DESIGN SUGGESTION [illegible]





STANDARDIZATION means ECONOMY. Adopt Standard Constructions. Reduce Number of Types to a Minimum.

For Further Design Suggestions of CIVIC TYPES see Sheet No W 105.

To safeguard against abuse & ensure their satisfactory operation Steel frames must be handled & stored with care with Job [illegible] & attended with competence. Definite instructions covering these matters should be specified.

N.S.W. Sydney Ornamental Steel Co. Ltd
38 Wells Street,
Redfern Sydney

INTERSTATE REPRESENTATIVES
S.A. W. G. Kirkland B.Sc. A.M.I.E.
of Aust
Ridge Avenue Glen Osmond Adelaide.

W.A.—A. E. Builder & Co. Ltd.,
56 A.M.P. Building
St. George's Terrace, Perth

(Continued on [illegible] page)

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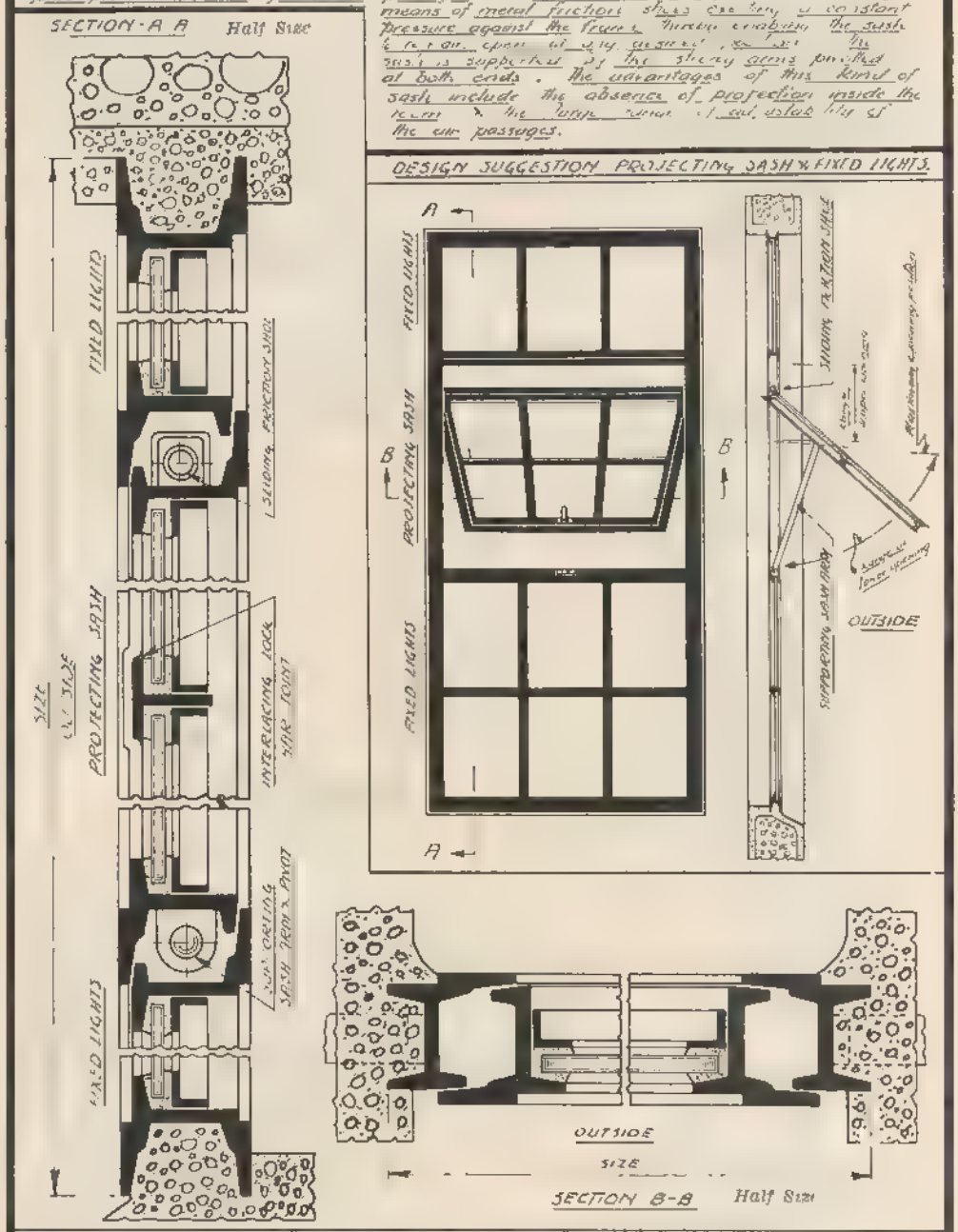
GAMLIN & METES PTY. LTD.
Manufacturers and Engineers.
OFFICE & WORKS
50 [illegible] STREET NO. FITZROY N.7
MELBOURNE VIC. Telephone J.W. 4222

STEEL WINDOW FRAMES — CIVIC TYPES: CLASS. C.

The opening known as "PROJECTING SASH" illustrated on this sheet constitutes the best of the ordinary steel frame openings. It is eminently suited to Australian climatic conditions. In its construction the sash head is [illegible] in the channel formed by the outer frame section while the lower end can swing out to an almost horizontal position thus leaving two air passages. The sash head is kept in position by means of metal friction shoes exerting a constant pressure against the frame thereby enabling the sash to remain open at any desired position. The sash is supported by the strong arms pivoted at both ends. The advantages of this kind of sash include the absence of projection inside the room & the large range of adjustability of the air passages.



STANDARDIZATION means ECONOMY. Adopt Standard Constructions. Reduce Number of Types to a Minimum.

For further Suggestions of CIVIC TYPES see. Sheet No W 106.

Glazing beads are either plain "Angle Beading" as shown on this sheet or the more ornamental "Moulded Beading" shown on the previous sheet. State kind required.

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Manufacturers and Engineers

OFFICE & WORKS
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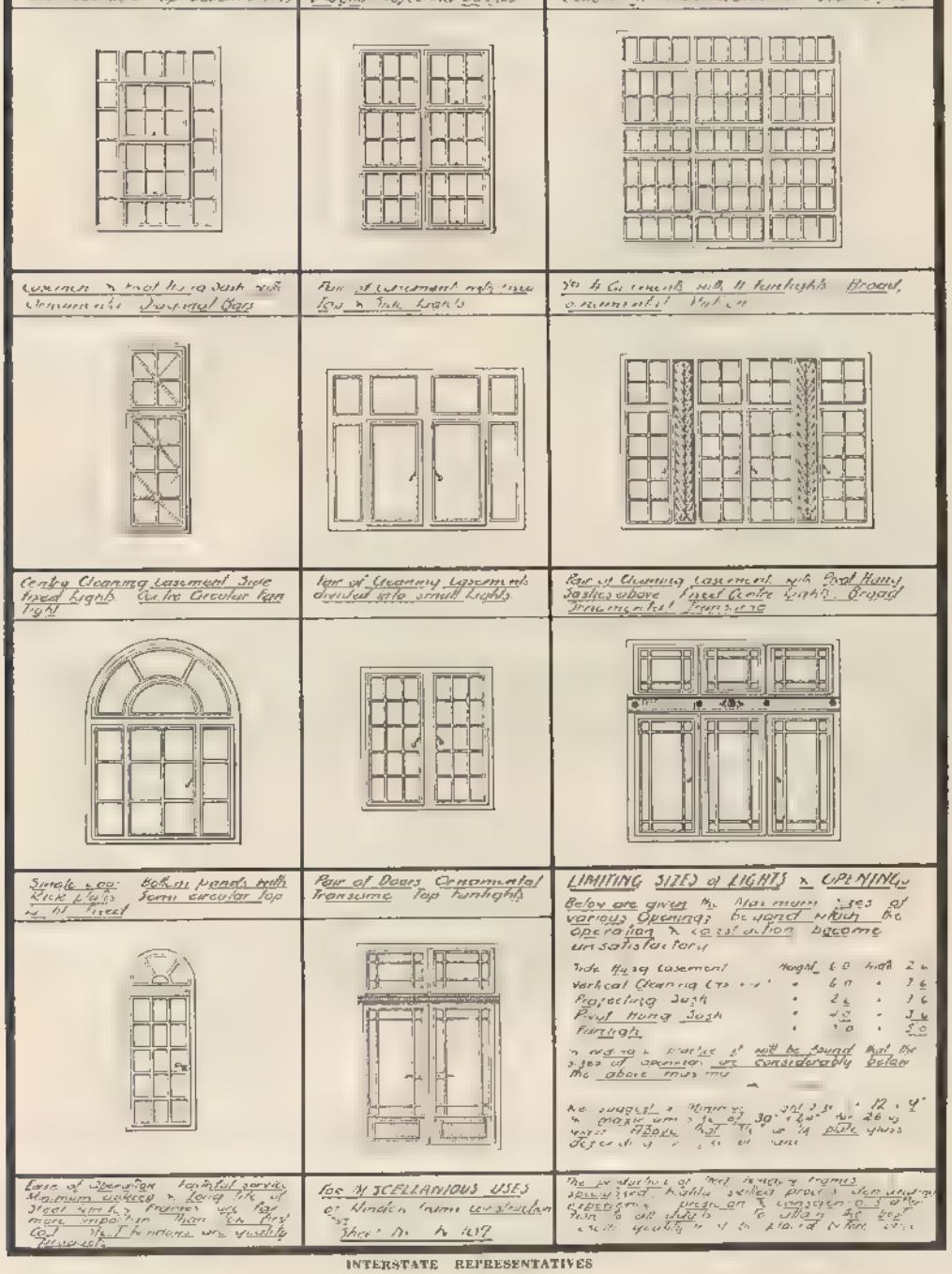
MELBOURNE VIC. Telephone J.F. 4222

STEEL WINDOW FRAMES – CIVIC TYPES: CLASS. C.

Our Types of Steel Window Frames lend themselves to a [illegible] selection of [illegible] choice with the view of each particular building [illegible] adaptation of the peculiar characteristics of Steel Window [illegible] to obtain [illegible] any degree [illegible] from the simplest to [illegible] Below are [illegible] examples of higher development. The [illegible]



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(Continued on next page)

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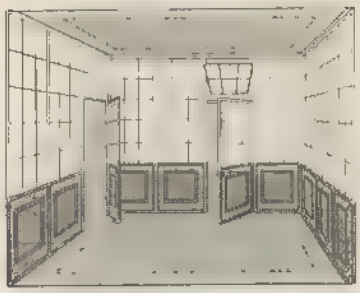
Manufacturers and Engineers.

OFFICE & WORKS.
501 RAE STREET NR. FITZROY, N.7
MELBOURNE Vic. Telephone J.H. 4222.

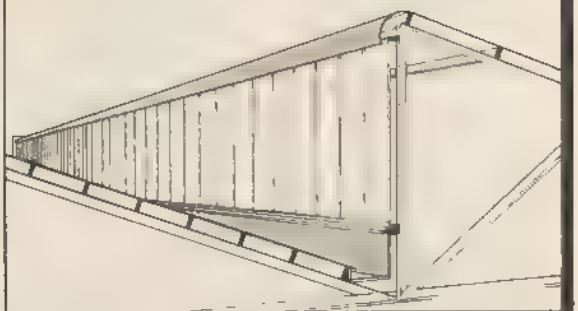
MISCELLANIOUS STRUCTURES.

Closely allied to the manufacture of Steel Window Frames is a large number of products of which representative examples are shown on this sheet. All such products we are prepared to manufacture & our long association with Building industry has enabled us to accumulate the specialized experience essential to the successful design & production of these articles.

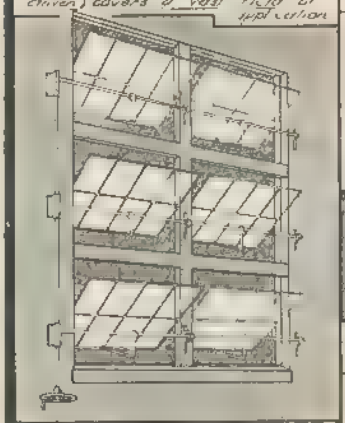
STEEL PARTITIONS for Offices factories & stores are easily fixed & removed. They are light & cheap & can be made to suit any height position & arrangement of panes doors & sashes.



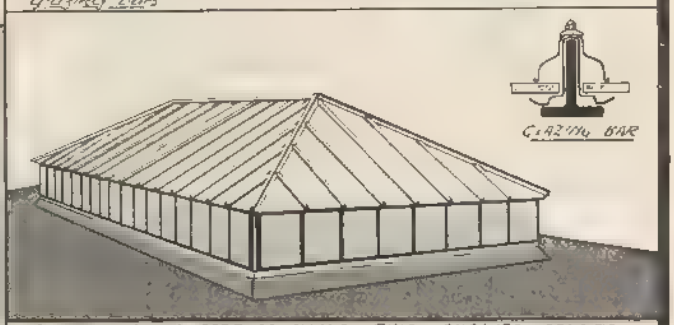
STEEL ROOF LIGHT Framing whether used for wood, concrete or structural steel construction affords the cheapest & best solution. Opening sashes can be provided to give additional ventilation.



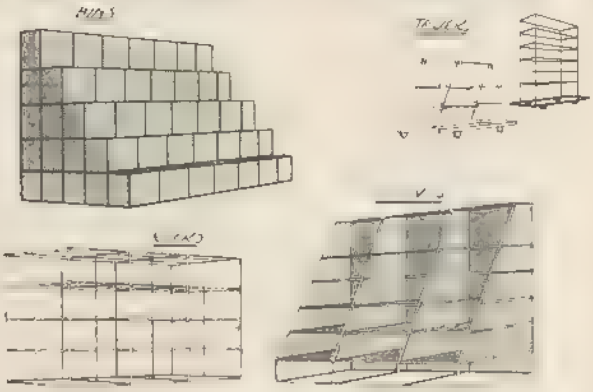
MULTIPLE & REMOTE CONTROL of sash operation (hand or power driven) covers a vast field of application.



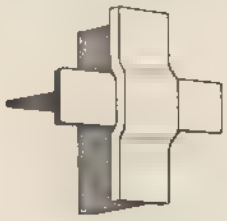
LANTERN LIGHTS or Glazed Roofs of various & heights of any designs can be constructed with bars or special glazing bars.



A variety of STORAGE RACKS BINS SHELVES STANDS TRUCKS etc can be constructed on the principle of the illustration shown. They are economical efficient & lasting.



Lack of interlocking LOCK BAR & of shrinkage cushion by 4" hole meeting stagger & double strength of intersection.



Besides steel Window Frames & allied products our Manufacturing Programme embraces. Fire Proof Doors to F.U. Regulations — Grills & Guard Bars — Fabricated Reinforcement Steel for Concrete Mesh & Lintel Bars — Ornamental Iron Work Balustrading & Handrail — Builders Ironwork Straps & Bolts — Electrically Welded Structures Trusses & Girders — etc.

INTERSTATE REPRESENTATIVES

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STEEL WINDOWS	KURTH BROS. PTY. LTD. *Wrought Iron and Steel Workers* REGISTERED OFFICE COR. CENTRE AND JASPER ROADS, BENTLEIGH, VICTORIA	16

Products

Steel Window Frames, Ornamental Ironwork, Gates, Balustrades, Grilles, Steel Furniture, and Structural Steelwork, etc.

Recent Contracts

Recently completed Victorian contracts include work for The Commonwealth Note Printing Works, Fitzroy; St. Anthony's R.C. [illegible] Hitchcock Memorial Chapel, Geelong, and also Ornamental Gates, weighing over one ton, for James Marsh & Co., North Melbourne

KURTH'S SLIDING STEEL WINDOWS

(Patent applied for)

Description

We would particularly recommend our new sliding sash. This is made of 1½ in. moulded sections and slides on bronze rollers into the ordinary 2 in. cavity in brickwork, pulling after it a flywire screen, which is attached to the sash and to a spring roller housed in a neat metal box. The flywire screen and roller may be easily removed if necessary and the sash can be taken completely out of the frame.

The screen wire is rustproof phospor bronze, which rolls easily and smoothly on the spring rollers. The guides do not hold the screen tightly so as to damage the wire.

The window hardware of cast bronze is of pleasing and serviceable design.

Standard Types

Sliding sashes are indicated by dotted diagonal lines and the arrows showing the direction in which they slide.

TYPE A.—This type of window is essentially suitable for office and city buildings where flywire is not a necessity and the window cleaning has to be done from the inside. Made to any reasonable height or width, it can be furnished with or without glazing bars.

TYPE B.—This is a window [illegible] principal objective. It has one large fixed light with a sliding sash on either side furnished with spring roller fly screens.

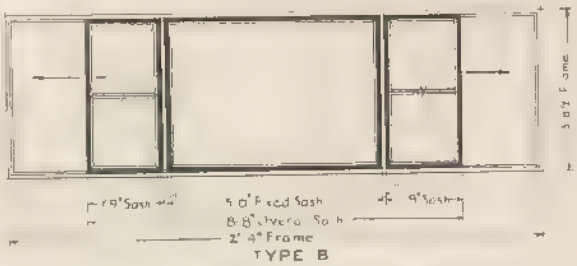
TYPE C.—This type of window has one fixed and one [illegible] window. The sliding sash is furnished with a spring roller fly screen. Can be supplied to slide to right or left as desired.

TYPE D.—This window consisting of twin sliding sashes fitted with spring roller fly screens is suitable for two-storey residences or flats, as it can be cleaned from the inside. It allows for maximum amount of light and air.

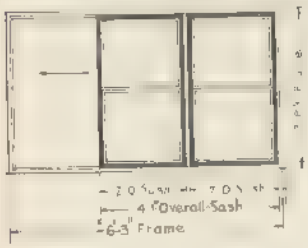
TYPE E.—Although it is of the smaller type window, this single sliding sash fitted with a spring roller fly screen gives a maximum area for ventilation, and can be supplied to slide to right or left as desired.

Note.—Kurth's [illegible] Windows [illegible] metal frame fly [illegible] screens.

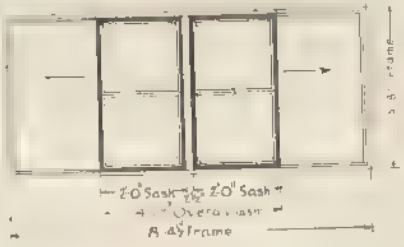
TYPE A



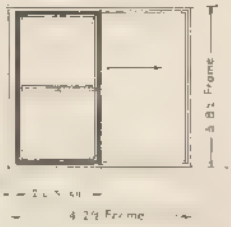
TYPE B



TYPE C



TYPE D



TYPE E

SPECIAL SIZES

Variations to the sizes of the above standard types [illegible] be made to suit special conditions. The standard types B, C, D and E (except the fixed sash of type B) have one middle horizontal glazing bar, but the sashes can be supplied with vertical and horizontal glazing bars to detail or without bars at all, which would be suitable for single pane glazing.

ENQUIRIES

Enquiries should state the standard [illegible] with any alteration to the sizes listed, also whether the sashes are to have single [illegible] glazing bars as per standard types, or glazing bars to detail for special cases [illegible] C and E state whether [illegible] sashes slide to [illegible] looking [illegible] in the in[illegible]

If [illegible] flywire [illegible] are not desired, advise us whether [illegible] hinged [illegible] screens [illegible] no screens at all are [illegible]

(See Overleaf for Details)

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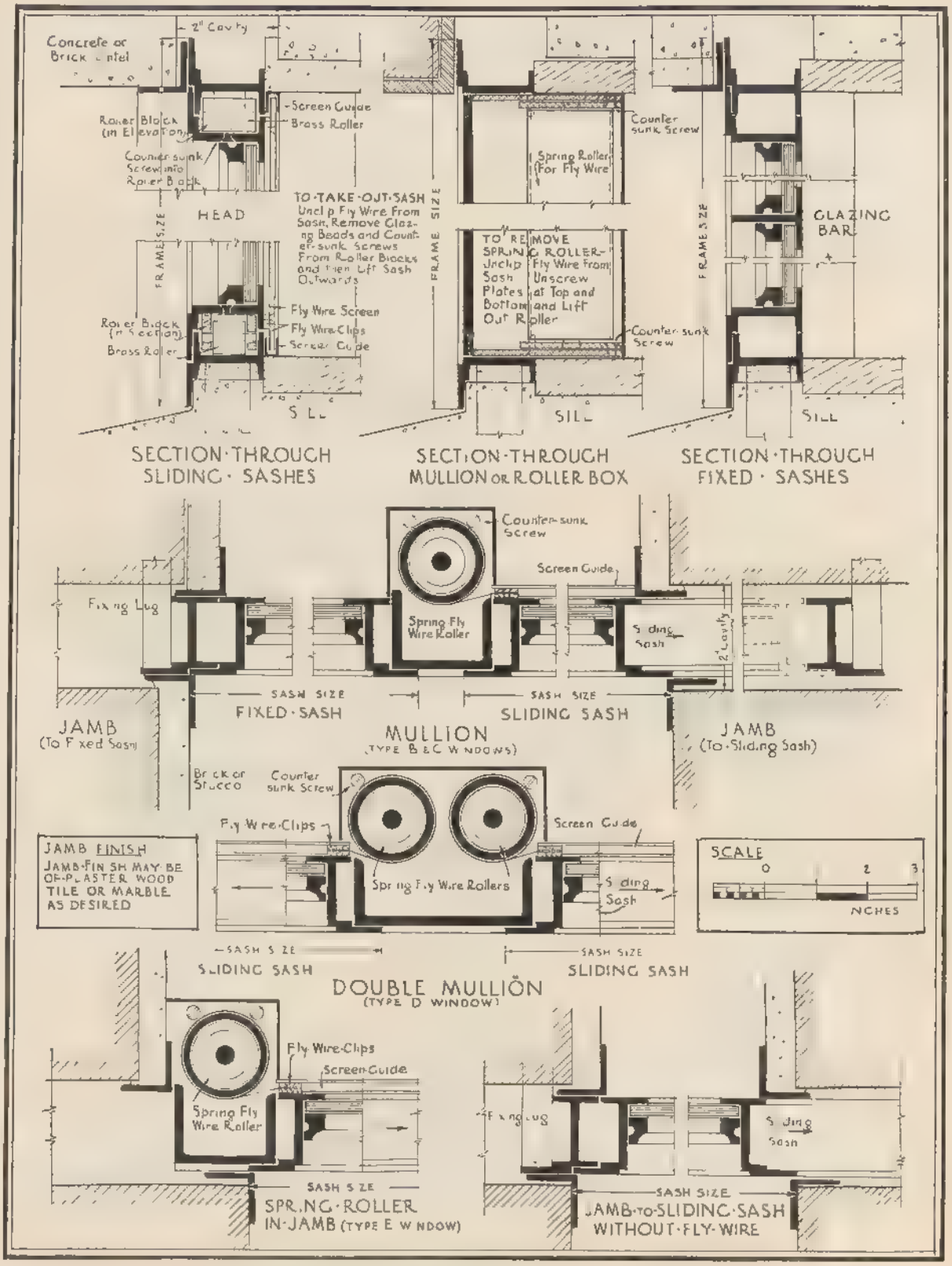

KURTH'S SLIDING STEEL WINDOWS

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WORMALD BROS. LIMITED

FIRE PROTECTION ENGINEERS
SINCE 1889

CITY OFFICE: 19 BLIGH ST., SYDNEY. FACTORY: YOUNG ST., WATERLOO, SYDNEY

BRANCHES:
MELBOURNE—180 Bay St, Port Melbourne. BRISBANE—"City Buildings," Edwards St.
NEW ZEALAND—"T. & G." Buildings, Wellington. ADELAIDE Bowden
PERTH—Wellington St.

16c

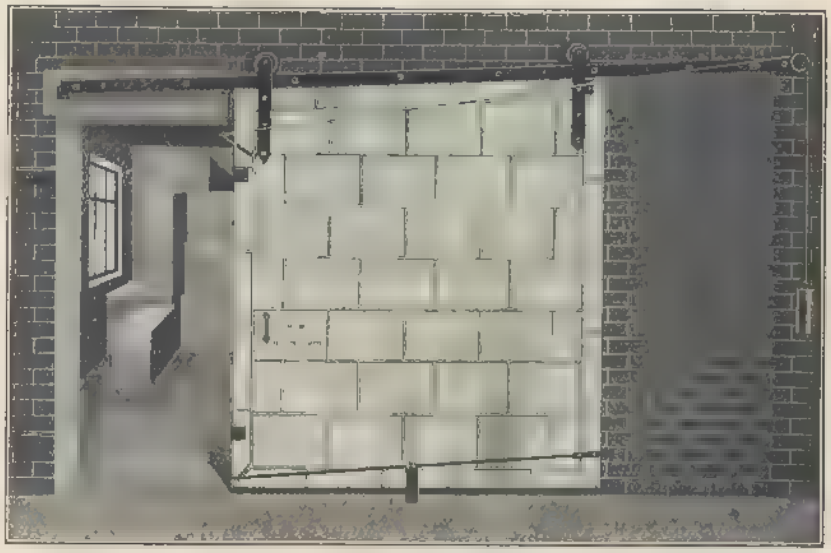
S.A.A File No

[For Other Products, See Index]

"WATERLOO" FIRE RESISTING DOORS

Armoured Doors

The object of a Fire Door is to automatically close an opening in the event of fire, and so block the progress of the flames. Not only the actual flames, but the heat of fire must also be contended with. When subjected to intense heat, solid metal doors become warped and twisted and very quickly become red hot. This heat naturally is conducted through to the other side, and so ignites any combustible materials within range of its influence. To overcome this, Armoured (or Ironclad) Fire Doors have been evolved, and they have proved on many occasions since that they are absolutely safe and dependable



Standard Automatic Sliding Fire Door.

Advantages

Because of their construction, Armoured Fire Doors will never warp or twist under heat, and they do not conduct much heat through to the other side A test made with a fire temperature of 1,960 deg. F. only conducted 90 deg. to the far side This would not ignite materials nearby, and so is far safer than any other form of door.

Automatic Hinged Fire Door

Construction

"Waterloo" Fire Doors are constructed of three or four layers of seasoned Baltic pine, or other non-resinous wood, tongued and grooved, with the layers running in alternate ways. The number of layers is determined by the area of the door. The boards are fastened together with special drive screws till the whole core is one solid piece. This core is then covered with special charcoal-tinned steel sheets in such a manner that all air is excluded. The sheets are actually free to expand, but they cannot become detached. Each of the covering sheets is specially lapped so that they all join one another to form the airtight cover.

Automatic Operating Device

To fully comply with the requirements outlined in a later paragraph, all fire doors must have an attachment which causes them to shut into position at the approach of fire. This is achieved by a system of pulleys and weights which are held back by a special fusible link. This is constructed of two sections of brass, fastened together by a special solder which fuses at approximately 155 deg. Fahr. Another system (sometimes used on hinged doors) is with a patented spring arm attachment. This is held back with the same type of fusible link and, when released, it slams the door shut.

(Continued on next page)

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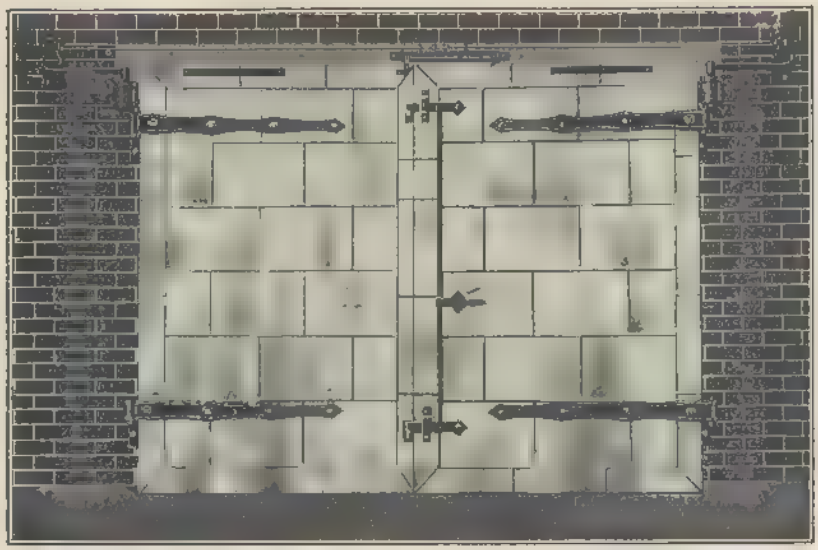


Automatic Double-Hinged Fire Doors, with Patent Closing Device.

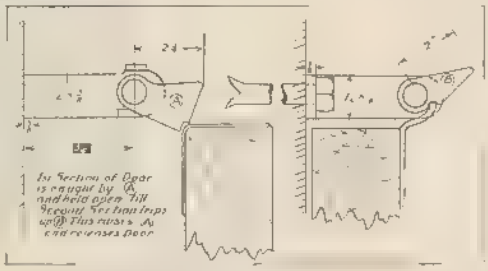
Patent Double-door Closing Device

When room does not permit the use of a large hinged door, and piers prevent it from sliding, the only alternative is to hinge it in two halves. Doors made in this way are rebated so that they will close together and form a solid break.

It is naturally vitally important that the correct door should close first. We have invented and patented a special lever attachment which, in the event of the wrong half shutting first, holds it open at A in sketch below. The second half then closes and releases the stop by lifting the cam B. The first section then closes into place.

Fire Underwriter's Requirements

To comply with the requirements for making a perfect "cut-off" for insurance rating purposes, doors must be fitted each side of the opening. The walls must be of fire-resisting construction and must be finished off square, so that the door has three inches cover on either side when closed. No opening should be made more than 45 square feet in area without obtaining special permission.

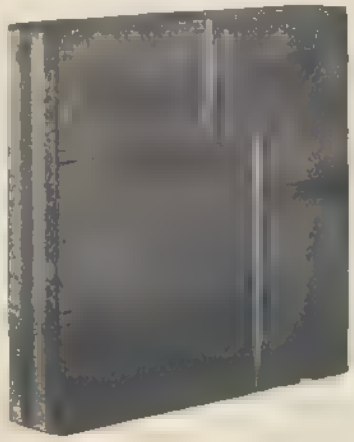


Closing Device for Double Doors.

Floor Details and Methods of Hanging

If a floor is not of fire-resisting construction, the step must be so built up that there is four inches of fireproof material projecting on either side. In the case of brick piers and wooden floors, it is sufficient to insert an iron checker-plate into the brickwork on each side with the necessary four inches of cover.

The doors are hung by rag bolts built into the walls with cement and are erected by us as a rule (not by the contractor) after the walls have been built



Section of Fire Door cut off after actual use—showing layers of wood unharmed.

Fittings

Care must be taken in using fittings which will withstand the heat of the fire, and also the possibility of sudden cooling by water. Careful experiments have been made and disclosed the fact that malleable iron is the surest and best material, and this is used almost entirely.

"Waterloo" Strongroom Doors

Waterloo Strongroom Doors are built on the Fire Door principle, and are designed for fire protection more than burglar protection. They are fitted with a combination slide and 4-lever lock, however, which is proof against any petty thief.

The door is constructed of two thicknesses of ¾-inch tongued and grooved boards, reinforced with sheet iron between. Nails are then driven at close intervals right through from back to front and cleated, and then the whole is encased with lock-jointed, tinned steel sheets, as with an ordinary fire door. A front panel of thinner wood is now added, over which is drawn a final sheet of specially flattened sheet steel. This is enamelled and gives a massive and ornamental finish to the whole door.

Specification

The Waterloo Standard Strongroom Door gives a daylight opening of 6ft 3in. x 2ft. 3in. It is supplied with a mild steel frame, which fits a reveal of 6ft. 5½in. x 2ft. 7½in, and is secured to wall with four splayed steel lugs.

(Continued on next page.

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"WATERLOO" ROLLER SHUTTERS

Where Used

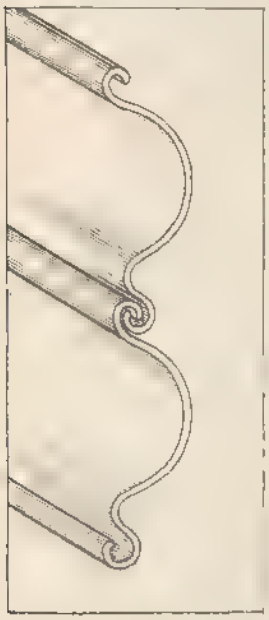
"Waterloo" Roller Shutters provide the ideal means of closing factory door-openings, garages, theatre windows, lift entrances, cartways, shop fronts, etc. They can be applied to almost any conditions, and have been made successfully up to about 25 feet in width. All the N.S.W. Government Tramways sheds have been fitted with these shutters, as well as many large Harbour Trust entrances, and those of large private concerns.

Different Types

"Waterloo" Steel Roller Shutters are made in two gauges—17 and 21 gauge. The heavy gauge is rolled with wider slats and is recommended for large openings where heavy wind resistance is experienced. The 21-gauge slats for all ordinary openings.

Construction

Steel Roller Shutters are constructed of rolled steel slats interlocked by sliding each slat along the one next to it, as shown in the accompanying diagram To prevent these slats from sliding out of line, malleable iron nibs are riveted on to the end of each alternate pair of slats The curtain is then fastened with metal thread screws to a steel drum, inside which is fixed a spindle on a spiral spring. Adjustment is given so that the tension of the spring can be set to give easy operation. Large shutters, however, cannot depend entirely on the spring, and so gearing is provided—operated by the hand chain—as shown in the diagram at side. Provision is made for locking by the use of a flat bolt attachment to the bottom rail.



Steel Interlocking Slats.

Fire Underwriters' Shutters

Fire Underwriters' 21-gauge Steel Shutters must be automatic in closing, and so, by special gearing, held with a fusible link, they run down into position when released by the fire. They are used as a "cut-off" on fireproof stairways and in front of lift openings when coming up into the middle of a building. They must have a 3-inch cover on each side of the opening and also extend quite flat for three inches above the top before starting to curl away to the drum.

If the floor is not of fireproof construction, an iron checker-plate must be fitted on floor at opening.

Space Required

For the most satisfactory job, 17 inches of headroom is required. Shutters can be erected, however, with less, but in this case, the curtain commences to curve away from the lintel at the top and, if set too low, when fully up, some of the roll will project into the opening Measurements for side room are given in the diagram below for steel shutters, but garage shutters in wood can be erected with less

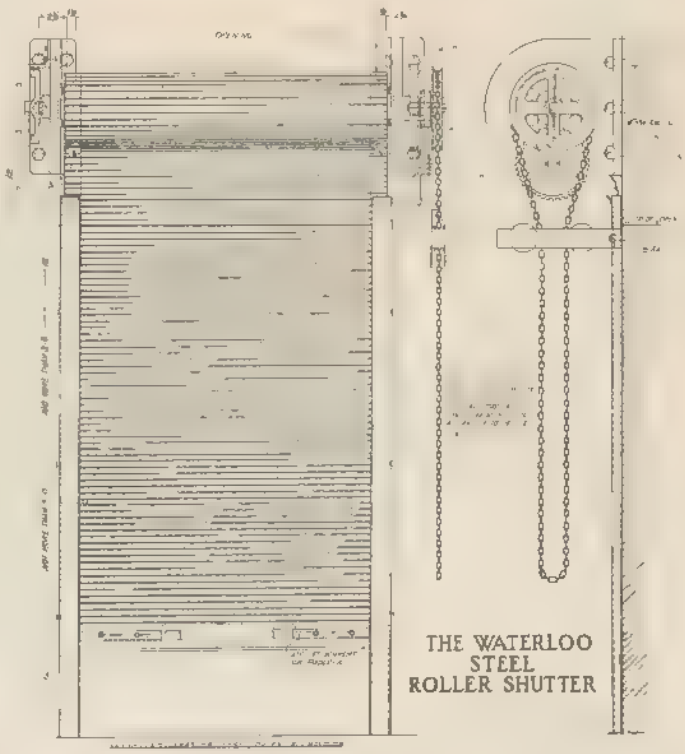
Fixing

Roller Shutters are better fixed after the opening is completed. We prefer to do this and, wherever possible, actually carry out the work ourselves If a contractor is going to do it, however, we supply blue prints giving details.

WOOD ROLLER SHUTTERS

"Waterloo" Wood Roller Shutters are used mainly for private garage use, and because of their ease of operation and saving in room, are ideal. Hand chains are unnecessary for ordinary sizes, as they are spring balanced and require very little effort to raise or lower them—4½ inches of room is required at the sides and about 15 inches headroom. No great strength is needed in the lintel in this case, however, as the brackets carrying the drum and roller are secured to the wooden guides.

"Waterloo" Wood Roller Shutters are constructed of seasoned 11/16th inch redwood slats, drilled to take strips of copper and webbing strips, which are threaded at intervals of about 18 inches right through from the bottom rail and fastened to the drum at the top.



Gearing and Bracket Arrangements for Steel Roller Shutter

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28*a*

S.A.A. File No

AUSTRALIAN METAL PRODUCTS PTY. LTD.

GENERAL OFFICE AND PLANT:
REAR NICHOLSON & SCOTCHMER STREETS
FITZROY, VICTORIA

Interstate Distributors:
SYDNEY—H. E. McClelland, 55 York Street,
BRISBANE—Messrs. Bernays & Anderson, 125 Adelaide Street.
ADELAIDE—Messrs. George Wills & Co. Ltd., 31 Grenfell Street.
PERTH Messrs. George Wills & Co. Ltd., 156 St. George's Terrace.

SANYMETAL

[For Other Products, See Index]

Products

Sanymetal Partitions are built for Toilets, Lavatories, Urinals, Dressing Rooms, Showers, Smoke Screens, Ward Screens and Wainscot, for Industial, Office, Commercial and Public Buildings, as well as for Schools, Churches, Hospitals, and Institutional Buildings, etc.

The New Sanymetal Unit Panel Toilet Partition

This new Sanymetal Toilet Partition responds to a popular demand for a metal partition embodying every requisite for a good appearance and long life, and, combined with simplicity of design, represents an economic proposition unequalled.

General

A simple and substantial design (embodying several basic patents), neat and clean cut appearance characterise these products. Rust resisting finish, tight joints, elimination of corners and cracks that collect dust and dirt, turned-in edges and special base shoes, all contribute to the exceptional sanitary qualities of these products.

Construction

"Sanymetal" Toilet Sections are usually made up of two units—a panelled partition joined to a supporting post, and a door. Partition panels are designed with a neat rail at top and bottom, and finished off with attractive drawn mold. Post and panel are welded into one rigid unit and delivered completely assembled, saving time on the job. Doors are made of drawn molded sections to all sides. Posts are fitted with polished aluminium top casting carrying pipe rail bracing, and secured to floor with special sanitary base casting. This base shoe is also polished aluminium, self-draining, full three inches high, coved at bottom, and adjustable to uneven floors. Material used is 16-gauge full cold rolled sheets. All metal edges, etc., are concealed and interlocked. Our method of construction eliminates all unsightly spot welds, projecting bolts, nuts and screws. All doors are fitted with "Sanymetal" full floating ball-bearing gravity roller hinges, latch and bumper. All rails and stiles are drawn not bent under a press. Thus clean, sharp corners are obtained as in the best style of metal doors.

Erection

Erection is simple and easy. No drilling of partitions is required on the job. Partitions are securely fastened at floor and walls, so that installation remains rigid, shake and rattle proof. Doors do not bang.

Sanymetal Toilet Partitions at the Taxation Offices, Melbourne.

Finish

Particular attention is given to finish. Partitions and Doors present an impervious hard enamelled surface, very easy to clean, and non-absorbent of moisture. After a priming coat of rust-resisting paint, two coats of high-grade enamel are then applied and each coat baked on at a high temperature. Standard colours are Olive Green and Battleship Grey. When delicate colours, such as white or cream, are desired, it is preferable to use lacquer finishes baked hard, as we have found from experience that this is more satisfactory for such colours.

Sizes

"Sanymetal" partitions can be constructed to any reasonable size to suit Architects' requirements.

Recommended standard sizes for toilet partitions are 3 ft. wide, measured c. to c. of stalls and 5 ft. from wall to centre of post; height of partition, 9 in. clear of floor, 5 ft. 3 in. height of panel and 9 in. to centre line of rail; total overall height of 6 ft. 9 in.

Sanymetal Full-Floating Ball-Bearing Gravity Roller Hinges

These are springless, operating entirely from force of gravity. They are strong, simple, positive in action, and containing nothing to break or wear out. The lower hinge, containing the gravity-operated mechanism, is completely encased and assembled as a unit in the factory. Within this, and thoroughly protected from dirt and moisture, are the inclined track and hardened steel roller secured by a special alloy steel self-lubricating pin. The hinge is universal in its adaptability to any type of swing door of any material. Doors may be self-closing, self-opening, double-acting, out-swinging or in-swinging. They may come to rest at any desired angle.

Service to Architects

Any enquiries on particular problems relating to other uses for "Sanymetal" partitions are welcomed by the Manufacturers.

Price lists and information on crating and delivery will be mailed at your request.

Sanymetal Partitions

are

Hygienic, Rigid, Less Costly, Easily Fixed, High-Class Appearance

(Continued on next page)

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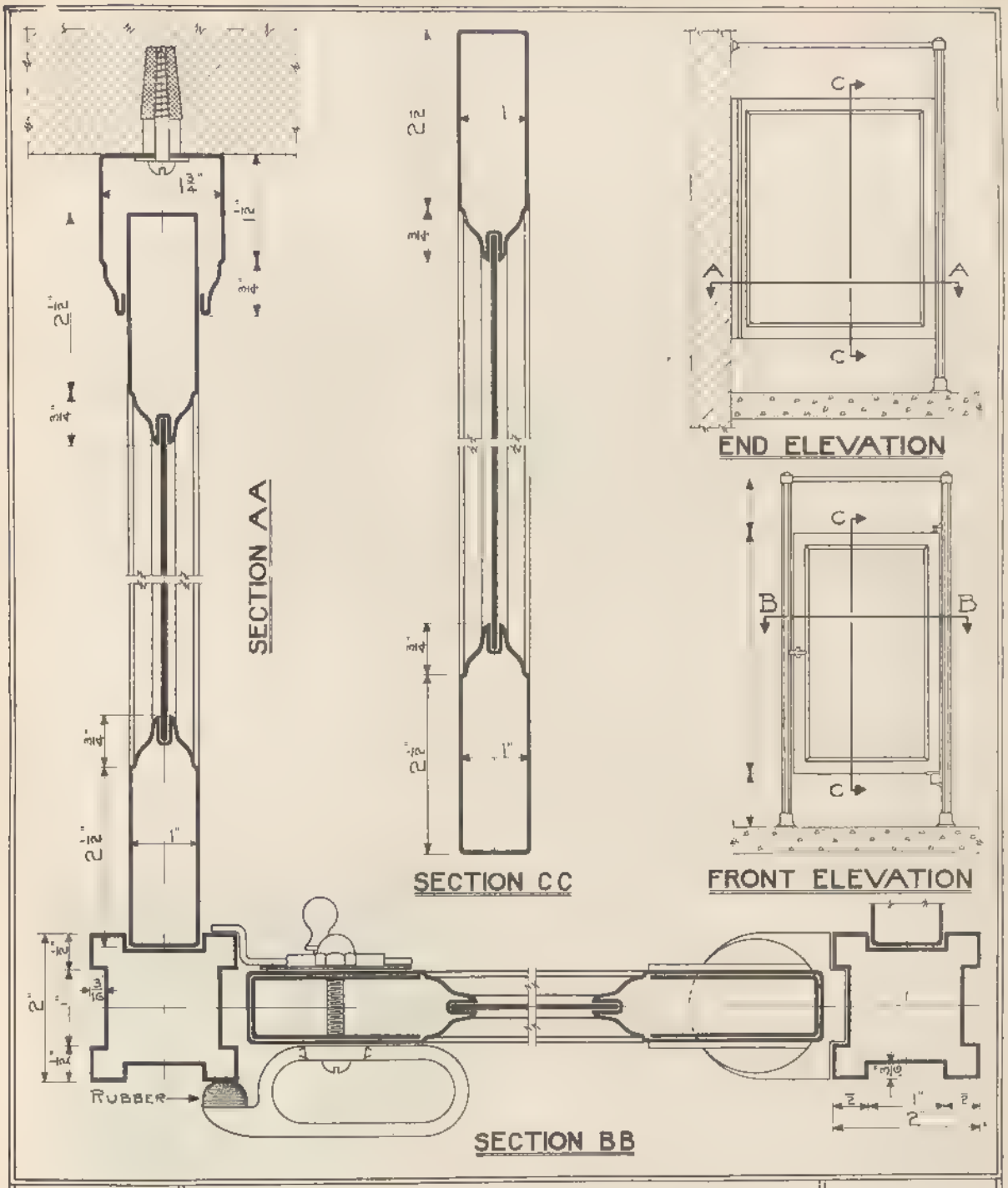

(Continued on next page)

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ARCHITECT'S SPECIFICATION

METAL PARTITIONS

Partitions indicated on plans (or describe location) shall be entirely constructed of hollow metal furniture steel and as follows:—

PANEL CONSTRUCTION

Each partition shall be made of drawn hollow metal interlocking mouldings with all edges concealed, having 16 gauge full cold rolled panel sheets securely locked into moulded rails at top and bottom and channel stile against wall and securely welded to front door post forming unit panel. Partitions shall be fastened to wall by means of an O.G. drawn adjustable channel with at least three concealed screws or toggle bolts as required. Back stile of partition shall be inserted into channel and secured with screws through top and bottom of channel.

POSTS AND RAILS

The front posts of partitions shall be of drawn hollow metal forming sunken panels on four sides.

Head rail brace shall be of 1¼-in. diameter drawn hollow metal tubing.

Polished aluminium self-draining base casting, for setting front post of partition to floor with head cap of similar material, to take head rail bracing, shall be furnished.

DOORS AND HARDWARE

Doors shall be made of 3¼ inches wide by 1 inch thick reinforced drawn metal stiles and rails fitted with 16 gauge panel sheet similar to partitions.

Doors shall be equipped with encased "Sanymetal" full floating ball-bearing gravity roller hinges with insured adjustment to make doors (outswinging), (inswinging), (self-closing), (self-opening), and with latch and bumper.

All door hardware shall be of polished aluminium and applied with nickel-plated bolts and cap nuts.

FINISH

All metal shall be thoroughly sanded, washed with benzine, filled and primed, and two coats of Olive Green (or Battleship Gray) baked on, or (if White or Cream finish is specified) and two coats of White (or Cream) applied in a lacquer finish.

SUPPLY (OR INSTALLATION)

The whole of the above metal partitions shall be supplied and installed by the Australian Metal Products Pty. Ltd.,

or

The whole of the above metal partitions included in this contract shall be supplied and delivered at the site by the Australian Metal Products Pty. Ltd. The Contractor shall install in a workmanlike manner and in accordance with the manufacturer's instructions.

LIST OF TYPICAL INSTALLATIONS

New T. & G. Building, Sydney—A. and K. Henderson.
Perth University, Western Australia—Rodney Alsop and H. Bramwell Smith.
Northcote Town Hall, Victoria—H. A. Norris.
Taxation Offices, Melbourne—Oakley and Parkes.
"Vaughan" Building, Melbourne—Gawler & Drummond.
Women's Hospital, Carlton, Victoria—A. A. Fritsch.
Thos. Evans Building, Melbourne—Hare, Alder, Peck and Lacey.
Julius Kayser Building, Richmond, Victoria—J. Plottel.
C. of E. Girls' Grammar School, South Yarra—Gawler and Drummond.
Shell Building, Adelaide—E. H. McMichael & Harris.
State Electricity Commission Building, Melbourne—A. R. La Gerche.
Newspaper House, Perth.
Austin Hospital, Heidelberg, Victoria—Stephenson & Meldrum.

HOSPITAL INSTALLATIONS

General

The outstanding sanitary value of metal partitions makes them specially desirable for hospital and allied uses. On account of popular demand everywhere for semi-privacy in wards, "Sanymetal" cubicles are coming into general use for this purpose.

"Sanymetal" provides a rigid, good-looking, easily cleaned, fire-proof and highly sanitary partition at a practical cost.

Construction

"Sanymetal" hospital cubicles have the same qualities of substantial, clean cut and rattle-proof construction that are characteristic of other "Sanymetal" products.

Posts. Posts are of 2-in. square, hollow drawn metal, forming sunken panels on four sides. Each post is capped at the head with an aluminium top casting and at the foot with an aluminium base casting.

Bottom Panel. Consists of 16 gauge, full-rolled cold sheets. Panel may be moulded or flush type, although the latter is preferable in view of its more hygienic qualities.

Top Panel. Glass frame is made of drawn steel mouldings welded into one continuous piece and put in by spring clips without the use of screws. The frames can be glazed with any type of approved glass.

Top Rail. Top rail over glass panel is formed by two drawn channels of 1½ x 1 in., fastened between posts.

Head Rail.—Head rails brace between adjacent cubicles is 1¼ x 1 in. tubing. Where curtains are used, the head rail is utilised for a curtain rod.

Finish.—Standard finishes of Olive Green and Battleship Grey baked enamels, or lacquered finishes of White and Cream can be applied as previously stated.

Doors.—If desired, doors instead of curtains will be supplied. These are similar in all respects to those described in the above specification, and are hung on springless, self-acting, "Sanymetal" gravity roller hinges.

Typical example of Sanymetal Hospital Partitions

Service

We solicit your enquiries in all matters concerning hospital cubicles and screens. Our service is at your command whenever required, and layouts will be submitted without obligation.

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

WORMALD BROS. LIMITED

FIRE PROTECTION ENGINEERS
SINCE 1889

CITY OFFICE: 19 BLIGH ST., SYDNEY. FACTORY: YOUNG ST., WATERLOO, SYDNEY

BRANCHES:
MELBOURNE—180 Bay St., Port Melbourne BRISBANE—"City Buildings," Edwards St.
NEW ZEALAND—"T. & G." Buildings, Wellington. ADELAIDE Bowden.
PERTH—Wellington St.

14k

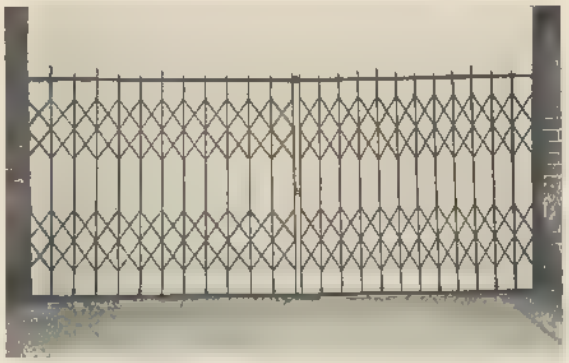
S.A.A. File No.

[For Other Products, See Index]

COLLAPSIBLE GATES

"Waterloo" Gates

"Waterloo" Collapsible Gates are adaptable to any opening and can be made up to widths which would prohibit the easy handling of any other gate. They can be made as fixtures to the sides with movable top and bottom bars and, when "collapsed," can be made to hinge back out of the opening. If the sides of an opening are not sufficiently strong to support the gate, removable standards can be fitted. For smaller gates, where the height is greater than the width, the top and bottom bar can be swung into an upright position alongside the gate channels and the whole then hooked together Collapsible gates have also been very successfully used in private homes over windows as a protection against burglars. They enable the window to be open for ventilation, yet making it impossible for anyone to enter



A Standard "Waterloo" Collapsible Gate with "Spearhead" Finish.

Construction

"Waterloo" Collapsible Gates are made of either ½-in or ⅝-in. channel iron, fastened by two groups of flat wrought iron strips These are fastened at the centres with a loose pin and the ends are left free to slide in the channel with the operation of the gate Rollers are fixed at intervals at the bottom to slide on the bottom roller. Where standards are needed, they are usually made of 1-in. square bar iron, finished off at the top with an ornamental moulded spike. The channel iron gate laths can be finished off "square," "spiked" or slightly curled in the shape of a "spear-head."

Method of Fixing

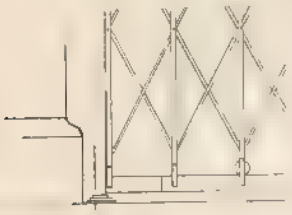
There are no set methods for fixing collapsible gates, as the conditions vary with each job. We therefore make each gate to suit the particular needs However, wherever possible, rag bolts are cemented into the masonry with wrought iron lugs attached. These are made to hold the top and bottom rails in a groove provided.

When the gate is to swing back flush with the opening, the lugs are fixed as usual and the gate suspended on bearings hooked into them.

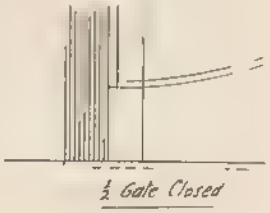
Where standards are necessary, iron boxes are set into the ground and the standards let into them. When desired, dust caps are provided for protecting them when the standards are out.

LIFT CAR GATES

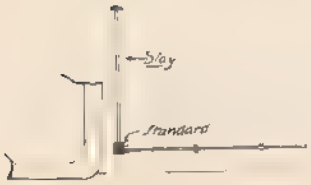
Lift Car Gates do not vary greatly from ordinary collapsible gates, but several rules regarding fixing must be carried out. The only requirement of manufacture is that the bars of the gate must be four inches from centre to centre instead of the usual six inches The top bar is made a fixture and the bottom runs in a channel sunk into the floor of the lift car. The gate must be set back not less than three inches from the front of the car floor. No special fixing is required, and we suit each gate to the particular conditions of the job.



Elevation and plan showing section of gate with movable bottom rail and side standard made to lift out.



Elevation and plan of gate with hinged top rail and fixed bottom rail set into ground. Gate in this case slides back past pier to give full clearance.



Showing various methods of fixing.

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RAMSAY'S ARCHITECTURAL AND ENGINEERING SPECIFICATIONS

This Specification Manual supplies complete and/or optional paragraphs for many new materials and methods of construction not previously covered in manufacturers' literature or textbooks, for instance :

Electrically Welded Roof Trusses
The Control of Admixtures in Concrete
Metal-covered or Hollow Metal Door Construction
Waterproofing (against static head) of basement or retaining walls and floors
Flush Type Wood Doors
Texture Finishes in Plaster, Paint or Stucco
A Domestic Refrigerating Unit—or a 16-ton Commercial Unit
The Control of Sanitary Arrangements on a Large Building
The Laying Down of Jointless Composition Flooring
An Acoustical Control Treatment for an Existing Auditorium

THE ITEMS ABOVE INDICATE SOMEWHAT THE RANGE OF THIS MANUAL
IT IS AUTHORITATIVE, CLEAR, HELPFUL AND COMPREHENSIVE.

SEE THE CLOSING PAGES OF THIS CATALOGUE FOR FURTHER INFORMATION

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

SECTION H

[Containing S.A.A. Filing Section 19f]

ASBESTOS CEMENT PRODUCTS

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

19f

S.A.A. File No.

JAMES HARDIE & COY. LTD.

SOLE MANUFACTURERS OF

"FIBROLITE" ASBESTOS-CEMENT SHEETS
FOR WALLS, CEILINGS, PARTITIONS, GABLE-ENDS, ETC.

SYDNEY: "Asbestos House," York Street.
NEWCASTLE: 334 Hunter Street West
BRISBANE. 'Perry House," Elizabeth St
MELBOURNE. 581-83 Little Collins Street.
PERTH: Riverva e
NEW ZEALAND: Nathan's Building, Grey Street, Wellington.

WORKS: Camellia, N.S.W.; Brooklyn, Victoria; Rivervale, W.A.
SOUTH AUSTRALIAN AGENTS: Clarkson Ltd., 124 Rundle Street, Adelaide
TASMANIAN AGENTS: F. H. Stephens Pty. Ltd., Hobart and Launceston.

Architect's Private File Reference

What "Fibrolite" is . . .

"FIBROLITE" is an economical, strong, fire retardant, and durable building material, composed solely of Portland Cement and Asbestos Fibre. Supplied in big, sturdy sheets in a large range of handy stock sizes, it is easily and quickly erected, without waste and at a minimum cost for labour. The use of "FIBROLITE" often enables savings to be effected in insurance rates.

Of importance to users is the fact that **"FIBROLITE" is manufactured by the Exclusive "Hardie" Process,** which ensures maximum strength and durability and a uniformly high standard of quality.

Stock Sizes, Thicknesses and Weights:

"FIBROLITE" Asbestos-Cement Sheets are manufactured in the following stock sizes and thicknesses, supplies of which are always available for prompt delivery.

For Exterior Walls, Gables, etc.
No. 5 Sheets—3/16 in. thick.

Average Weight Per Sq. Yard, 18 lbs. (Approx.)

4 ft. wide x 3, 4, 5, 6, 7, 8, 9, 10, 11, and 12 ft. long.
3 ft. wide x 3, 4, 5, 6, 7, 8, 9, 10, 11, and 12 ft. long
2 ft wide x 3, 4, 5, 6, 7, 8, 9, 10 ft. long.
18 in wide x 3, 4, 5, 6, 7, 8, 9, 10 ft. long.
12 in wide x 3, 4, 5, 6, 7, 8, 9, 10 ft. long.

Special size sheets manufactured to order at small additional charge.

For Interior Walls, Ceilings, etc.
No. 4 Sheets—5/32in. thick.

Average Weight per Sq. Yd., 14 lbs (approx.)

4 ft. wide x 3, 4, 5, 6, 7, 8, 9, and 10 ft. long.
3 ft. wide x 3, 4, 5, 6, 7, 8, 9, and 10 ft. long
2 ft. wide x 3, 4, 5, 6, 7, 8, 9, and 10 ft. long.
18 in. wide x 3, 4, 5, 6, 7, 8, 9, and 10 ft. long.
12 in. wide x 3, 4, 5, 6, 7, 8, 9, and 10 ft. long.

Special size sheets manufactured to order at small additional charge

THICK SHEETS—"FIBROLITE" Sheets up to 3/4 in. thick made in any of the above sizes to order.

Directions for Fixing:

In fixing "FIBROLITE" Asbestos Cement Sheets, the directions hereunder should be followed :-

(1) All studs and joists must be of even depth so as to form a flat surface, and should be spaced according to the width of the "FIBROLITE" Sheets to be used, viz.—Sheets 4 ft. and 2 ft. wide, 2ft. centres; Sheets 3 ft. and 18in. wide, 18in. centres so that the spacing of the timber works in with the sheets

(2) Where the joints or edges do not fall on the studs or joists, an intermediate batten must be inserted to give a support behind every joint or edge.

(3) Nail sheets with special point galvanised "FIBROLITE" nails about every 6in., approx ⅜in. from edge and along centre of intermediate bearing. For pine timber 1in. nails are recommended, and for hardwood ⅞in nails are satisfactory

(4) Joints should be covered with "FIBROLITE" Cover and Angle Mouldings. Alternatively, wood cover battens or plaster cover mouldings may be used, offering a wide range of artistic panel treatments

Fibrolite

"The Building Material that Improves with Age"

Method of Treating Joints:

For exterior perpendicular joints, a strip of bituminous felt roofing should be tacked to the studs underneath the joints. For exterior horizontal joints, a strip of bituminous felt roofing should be inserted on the inside of the top sheet and lapped over on the outside of the bottom sheet, all joints being covered with "FIBROLITE" Cover and Angle Mouldings, or wood cover battens, of desired size

Cutting Sheets:

When delivered, "FIBROLITE" Sheets are not fully matured and can accordingly be easily cut with an ordinary saw. A better method of cutting the sheets is to use an old knife or chisel, cutting deeply along a straight edge and snapping where required.

Painting:

Where an artistic colour finish is desired on walls, partitions, ceilings, etc., covered with "FIBROLITE" Sheets, it is recommended that "FIBRO-C" Cold Water Paint be used. This high quality paint is specially manufactured for use on "FIBROLITE" and is made in 28 beautiful colour tones. Colour chart, directions for use, etc., obtainable on request from James Hardie & Coy Ltd.

Applying Roughcast to "Fibrolite" Sheets:

For exterior walls of "FIBROLITE" dwellings, etc., where a roughcast finish is preferred to the customary panelled walls, this treatment may be easily and economically obtained by roughcasting on the "FIBROLITE" Sheets. Directions obtainable on request

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Suggestions for Applying Wall Paper to "Fibrolite" Sheets

1. All "FIBROLITE" Sheets in area to be covered by wall paper should be given a coat of glue sizing.
2. All joints should be covered with narrow strips of unbleached calico and entire area of walls then covered with a cheap lining paper, which should be applied horizontally—across the walls, not down.
3. The wall paper is then applied in the usual way.

"FIBROLITE" COVER MOULDING

An economical, neat, and durable moulding used for panelling in conjunction with "FIBROLITE" Sheets.

Supplied with round or square edges.

Overall thickness . . . . . $\frac{3}{16}$in.
Stock widths . . . . . 2in., 2½in., 3in.
Stock lengths . . . . . 7ft., 8ft., 10ft.
Lengths of 6ft and 9ft. manufactured to order.

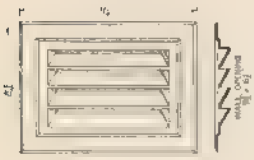
"FIBROLITE" ANGLE MOULDING

For internal or external angles.

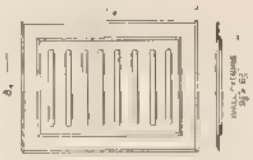
Supplied with round or square edges.

Overall thickness . . . . . $\frac{3}{16}$in.
Stock widths (A-A) . . . . 2in. x 2in., 2½in x 2½in, 3in. x 3in.
Stock lengths . . . . . 7ft., 8ft, 10ft.
Lengths of 6ft. and 9ft. manufactured to order.

"FIBROLITE" VENTILATORS

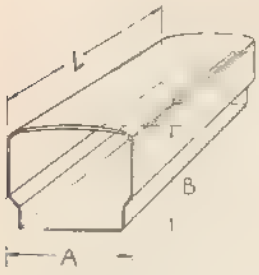


"Fibrolite" External Louvre Ventilator



"Fibrolite" Internal Ventilator

"FIBROLITE" HOLLOW FLOOR BLOCKS



"FIBROLITE" Hollow Floor Blocks are now extensively used in reinforced concrete floor construction. Weighing considerably less than coke breeze blocks, they materially reduce the dead weight of the floor and effect a substantial saving in structural steel work and other supporting members.

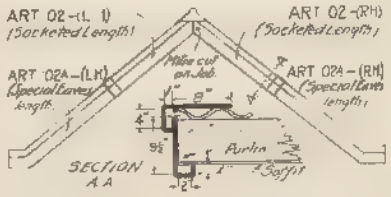
WIDTH "A" .	12in.	12in.	12in	12in.
DEPTH "B" .	6in.	8in.	10in.	12in.
Approx. Weight per lineal ft. .	6½lbs.	7lbs.	7¾lbs	8½lbs.

Standard Lengths ("L") . . 2ft., 4ft., 6ft., 8ft
Standard Thickness . . . . . $\frac{3}{16}$in. (approx.)

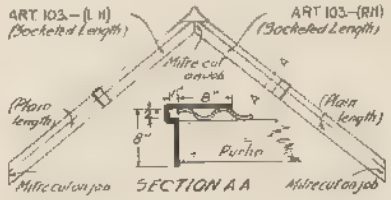
"FIBROLITE" BARGE MOULDING

"FIBROLITE" Barge Mouldings give a neat and well finished appearance to gable ends. They also ensure sound economy, being permanently durable, non-corrosive, resistant to fumes, and proof against sea-air. No painting is required.

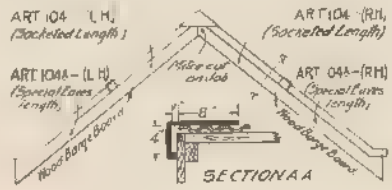
Manufactured to order in lengths up to 8ft., and in 3/16in., 1/4in., and thicker material as ordered. For fixing with an over-lap of 4in.



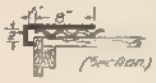
ART. 102 and 102A. "FIBROLITE" 2-Piece Barge Moulding, suitable for purlins from 10in. to 6in in depth. When ordering Art. 102A, give exact pitch of roof at ridge to ensure return finishing plumb.



ART. 103.—"FIBROLITE" 1-Piece Barge Moulding. When ordering, state number of lengths required with and without socket.



ART. 104 and 104A.—"FIBROLITE" 1-Piece Barge Moulding, used in conjunction with wood barge moulding. When ordering Art. 104A, give exact pitch of roof at ridge to ensure return finishing plumb.



ART. 105. Similar to Art 104, but measuring 8in x 2in., as per section.

"FIBROLITE" Barge Mouldings, $\frac{3}{16}$in. thick, are suitable for fixing to face of rafters. When fixed to purlin ends spaced not more than 36in. apart, ¼in material is recommended. For wider spacings, thicker material should be used.

All mitres to be cut on job by purchaser.

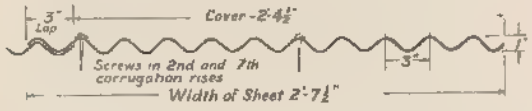
Order by Art. No., and state number of right-hand and left-hand sections required.

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

"FIBROLITE" CORRUGATED ASBESTOS CEMENT ROOFING

The most economical and suitable roofing for factories, industrial works, stores, wharf buildings, hospitals, theatres, and buildings of practically all types.

"FIBROLITE" STANDARD CORRUGATED ASBESTOS CEMENT SHEETS—ART. 75



End section of Sheet 31½-ins. wide, showing 3-ins. side lap fixing.

Standard Colour: Grey. Can be made russet colour to order at increased cost.

Standard Thickness: 1/32in. (approx.) Also manufactured to order in sheets up to ⅛ in. thickness, at proportionate increase in cost.

Stock Sizes: 2ft.7½in. x 4ft., 5ft., 5ft.6in., 6ft., 6ft.6in., 7ft., 7ft.6in., 8ft., 8ft.6in., 9ft., 9ft.6in., and 10ft.

Weight: 116 square yards = 1 ton (approx.)

End Lap: Sheets should be given an end lap of about 6-in., dependent upon position and pitch of roof.

Pitch: For a roof to be covered with "FIBROLITE" Standard Corrugated Sheets fixed with an end lap of about 6in., a pitch of about 20 degrees is recommended. When a pitch of less than 20 degrees is desired, the end lap to be given the sheets should be increased accordingly

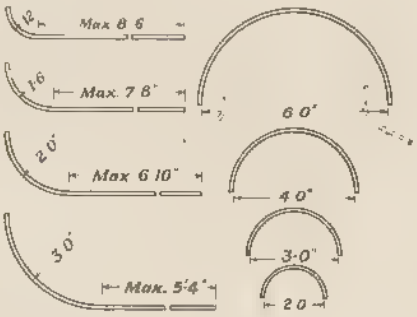
Purlin Spacings: Purlins or battens should be spaced at not more than 36in. centres, and should be so arranged that those under the end laps will be in the centre of lap.

Battens: Where battens are used, these should be about 3in. x 1½in. Oregon or soft pine

Directions for fixing "FIBROLITE" Standard Corrugated Sheets supplied on request.

CURVED SHEETS:

To work in with Art. 75. Stock Radii, 12in., 18in., 2ft., and 3ft.—measured on underside of Sheet



The above illustration shows stock curves to which "FIBROLITE" Standard Corrugated Sheets are manufactured to order. Sheets can also be curved to special radius, if required.

"FIBROLITE" ANGULAR RIDGE CAPPING ART. 92

For use with "Fibrolite" Standard Corrugated Sheets.
Standard thickness: 3-16in. (nom.). Standard length: 6ft.

Manufactured specially to order, with even or uneven wings to suit any desired pitch equivalent to the following sizes:—

6in. x 6in., 8in. x 8in., 9in. x 9in., 10in. x 10in., 12in x 12in.

Made in larger sections, in heavier material, as required

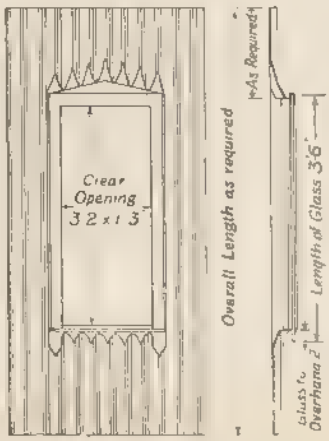
"FIBROLITE" 2-PIECE RIDGE CAPPING ART. 95

For use with "Fibrolite" Standard Corrugated Sheets.
ADAPTABLE TO ROOF ANGLE.
Standard thickness: 3-16in. (nom.). Standard length: 6ft.

Stock Sizes 6in x 6in., 8in. x 8in., 9in. x 9in., 10in. x 10in., 12in. x 12in.

"FIBROLITE" FIXED SKYLIGHT

For use with "Fibrolite" Standard or Super-Six Corrugated Sheets



Standard Clear Opening

3ft.2in. x 1ft.3in in centre of Sheet.

Stocked in 7ft., 8ft., 9ft and 10ft lengths.

Other lengths made to order with minimum of

For "Fibrolite" Standard Corrugated Sheets 5ft 6in.

For "Fibrolite" Super-Six Corrugated Sheets 7ft.

Manufactured to order with longer openings and/or with openings in position to suit job.

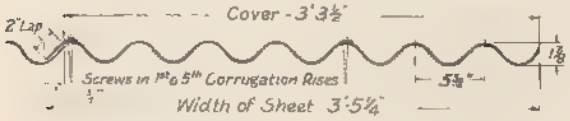
Supplied unglazed or glazed with ¼in wired glass standard size of glass 3ft 6in. x 1ft.6in. x ¼in

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

"FIBROLITE" SUPER-SIX CORRUGATED ASBESTOS CEMENT SHEETS

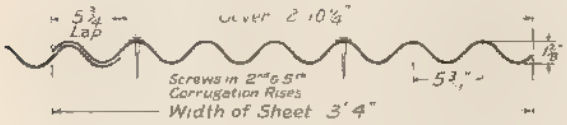
"FIBROLITE" Super-Six Corrugated Sheets are manufactured in two standard forms, viz

ART. No. 78: Sheets 41¼in wide, for fixing with side lap of 2in. (nominal)



End section of Sheet 41¼-ins. wide, showing 2-ins. side lap fixing

ART. No. 79: Sheets 40in. wide, for fixing with side lap of 5¾in. (nominal).



End section of Sheet 40-ins. wide, showing 5¾-ins. side lap fixing

Standard Colour. Grey. Can be made russet colour to order at increased cost

Standard Thickness: ¼in (approx.). Also manufactured to order in sheets up to ⅜in thickness, at proportionate increase in cost.

Standard Lengths: 5ft., 5ft.6in., 6ft., 6ft.6in., 7ft., 7ft.6in., 8ft., 8ft.6in., 9ft., 9ft.6in., and 10ft.

Weight: 100 square yards = 1 ton (approx.)

End Lap: Sheets should be given an end lap of about 6in., dependent on position and pitch of roof

Pitch: For a roof to be covered with "FIBROLITE" Super-Six Corrugated Sheets fixed with an end lap of about 6in., a pitch of about 20 degrees is recommended When a pitch of less than 20 degrees is desired, the end lap to be given the sheets should be increased accordingly

Purlin Spacings: Purlins or battens may be spaced up to about 4ft. centres, and should be so arranged that those under the end laps will be in the centre of lap

Battens: Where battens are used, these should be about 3in. x 1½in Oregon or soft pine

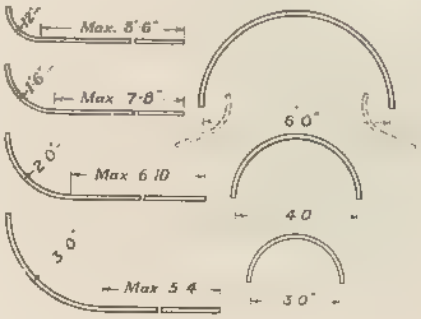
Directions for fixing "FIBROLITE" Super-Six Corrugated Sheets supplied on request

"FIXING" SERVICE. Maintaining a staff of competent roofing "Fixers" in each State, we are able to undertake the fixing of "FIBROLITE" Corrugated Roofs. Estimates will be supplied on request for "FIBROLITE" Standard or Super Six Corrugated Sheets supplied and fixed

Illustrated Catalogues for "FIBROLITE" Standard and Super-Six Corrugated Sheets supplied on request

CURVED SHEETS

To work in with Art. 78 and Art 79. Stock Radii, 12in., 18in., 2ft. and 3ft.—measured on underside of sheet.

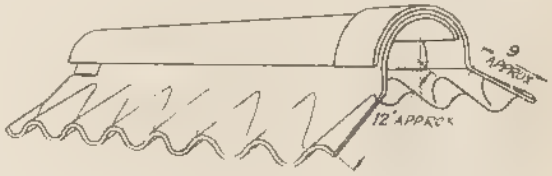


The above illustration shows stock curves to which "FIBROLITE" Super Six Corrugated Sheets are manufactured to order. Sheets can also be curved to special radius, if required

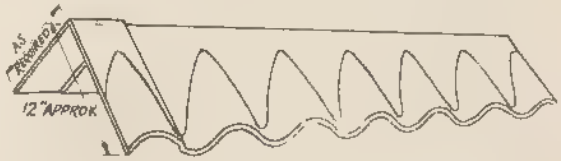
"FIBROLITE" SUPER-SIX FLUTED RIDGE CAPPINGS AND APRON PIECE

STANDARD THICKNESS: 3/16in. (Nominal).

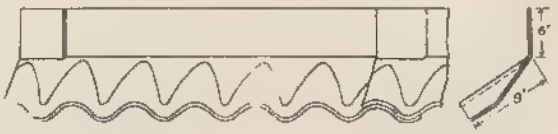
Manufactured in two different lengths to suit the particular width of the "FIBROLITE" Super-Six Sheets with which to be used.



2-Piece Ridging, adjustable to Roof Angle
Not suitable for Hips



Ridging, with one plain and one corrugated apron wing, for Sawtooth Roofs Manufactured in any width and pitch required



Apron Piece for Underflashing on "FIBROLITE" Super-Six Corrugated Roofs Manufactured in any width and pitch required.

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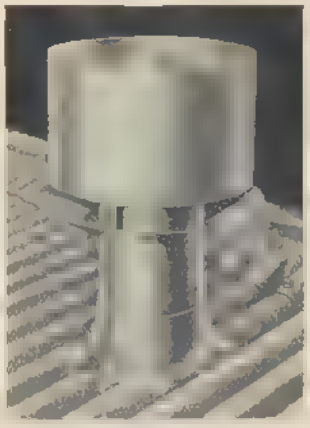
"FIBROLITE" ROOF VENTILATORS

FOR USE WITH "FIBROLITE" STANDARD AND SUPER-SIX CORRUGATED SHEETS



"FIBROLITE" Roof Ventilators ensure *efficient* ventilation at all times irrespective of the direction of the wind. There is no back-draught and maximum protection is provided against weather.

"FIBROLITE" Roof Ventilators also ensure *Sound Economy*—both in initial cost and maintenance. They possess exceptional structural strength and rigidity, are easily and quickly installed, and **require no flashing.**

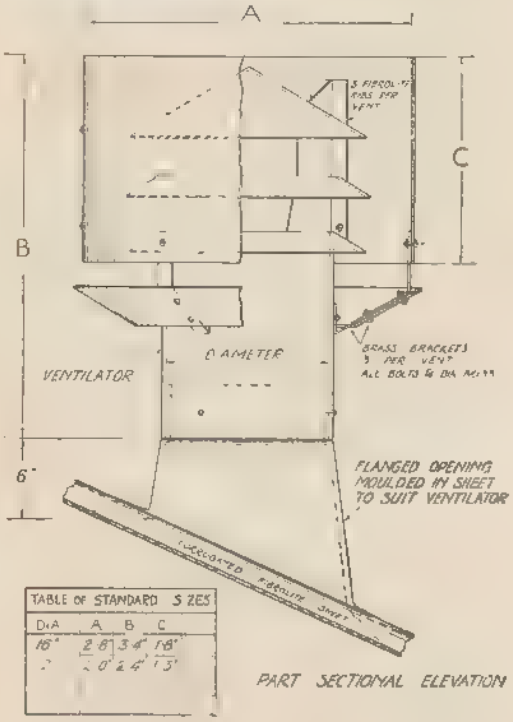


TABLE OF STANDARD SIZES			
DIA	A	B	C
16"	2' 8"	3' 4"	18"
20"	2' 0"	2' 4"	13"

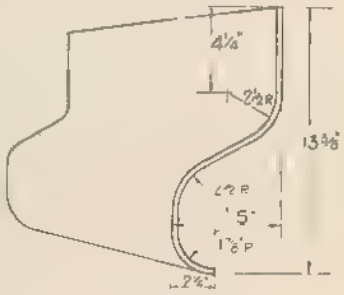
"FIBROLITE" LOUVRE BLADES

STANDARD SECTIONS:

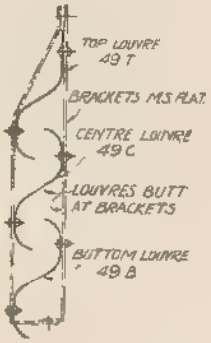
Standard thickness, 5/16 in. Maximum length, 6 ft.

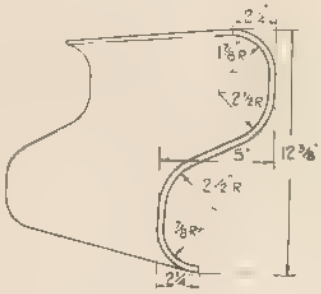
Also manufactured in a variety of other types, sizes, and thicknesses Full particulars supplied on request

"FIBROLITE" Louvre Blades offer definite advantages over other types of louvres in that they are permanently durable, non-corrosive, resistant to fumes, unaffected by sea-air, and NEVER NEED PAINTING



ART 49 T

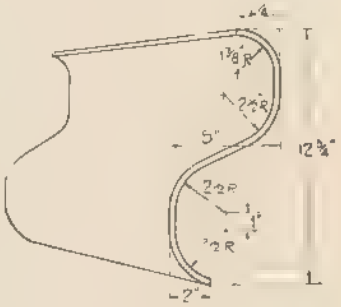




ART 49 C

Above illustration shows suggested method of fixing in sets of three Blades

May also be fixed in sets containing more or less Blades, as required



ART 49 B.

"FIBROLITE" ROOFING TILES

FOR DIAGONAL AND RECTANGULAR FIXING

Directions for Fixing, and full particulars supplied on request.

Colour	Size	Method of Fixing	Lap	Number per Square	Weight per 1000 (approx.)	Weight per Square (approx.)
Grey	16 in. x 16 in.	Diagonal	4 in.	100	26 cwt.	280 lbs.
Russet	16 in. x 16 in.	Diagonal	4 in.	100	26 cwt.	280 lbs.
Red	16 in. x 16 in.	Diagonal	4 in.	100	26 cwt.	280 lbs.
Blue-black	16 in. x 16 in.	Diagonal	4 in.	100	26 cwt.	280 lbs.
Grey	20 in. x 10 in.	Rectangular	4 in.	180	21 cwt.	423 lbs.
Russet	20 in. x 10 in.	Rectangular	4 in.	180	21 cwt.	423 lbs.
Blue-black	20 in. x 10 in.	Rectangular	4 in.	180	21 cwt.	423 lbs.

ECONOMICAL
ARTISTIC
LIGHT IN WEIGHT
SEA-AIR PROOF
PERMANENT.

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

"FIBROLITE" GUTTERS AND DOWNPIPES

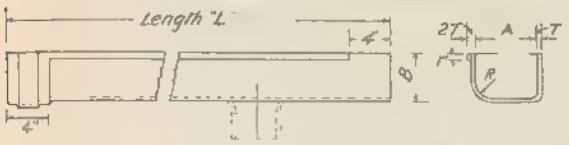
"FIBROLITE" EAVES GUTTERS

Made to order in any required size.

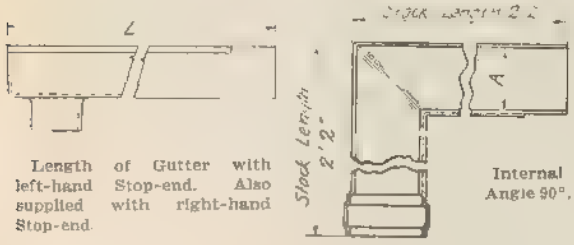
STANDARD SIZES AND DIMENSIONS:

Size	*Stock Length	Maximum Length L	DIMENSIONS T	R
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
6 in	6ft	[illegible]	[illegible]	[illegible]
8 in	8ft.	8ft.	4½in.	5/16in.	2in.
8 in	8ft.	8ft.	5½in.	7/16in.	3in.

*Shorter lengths made as required

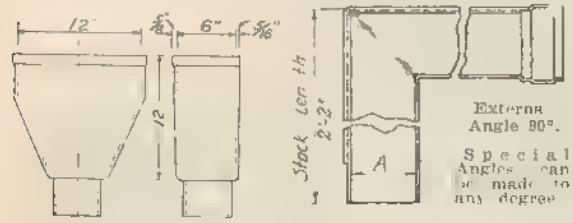


PLAIN LENGTH OF GUTTER.—Supplied with outlets in any position required to suit any type of downpipe, or without outlets. Flange is on left-hand end, unless otherwise ordered.



Length of Gutter with left-hand Stop-end. Also supplied with right-hand Stop-end.

Internal Angle 90°.

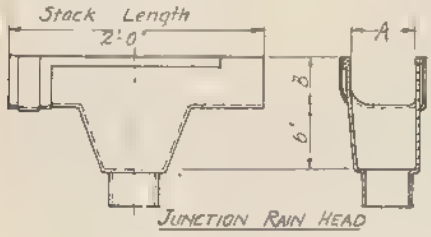


External Angle 90°.

Special Angles can be made to any degree.

EXTERNAL RAIN HEAD

Outlets as Required.



JUNCTION RAIN HEAD

"FIBROLITE" BOX GUTTERS

Manufactured to order in any size and thickness required, in lengths up to 10ft.6in., with outlets, junction rainheads, and external rainheads to suit.

Standard Sizes	Standard Lengths*	Maximum Lengths	Standard Thickness
12in.	10ft.	10ft. 6in.	7/16in.
7½in.	9ft.	9ft.	7/16in.

*Shorter lengths as required.

[illegible] supplied on request

"FIBROLITE" SOCKETED PIPES

For Rainwater, Flume Pipes, etc.

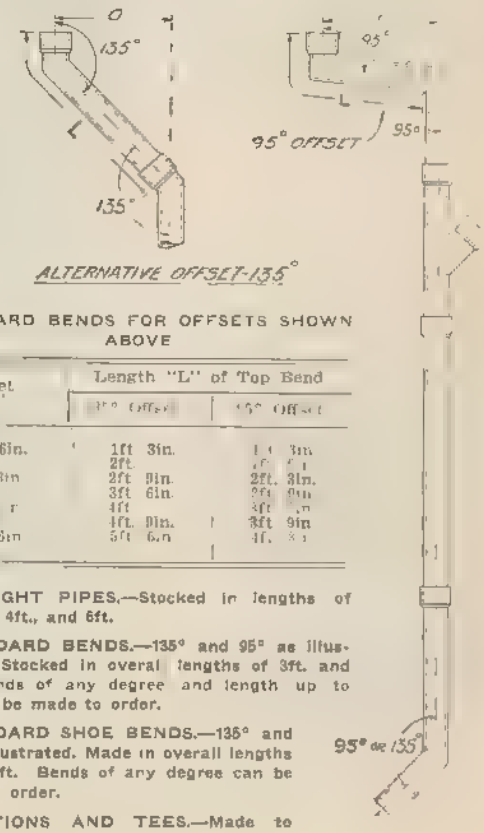
Manufactured in Round, Rectangular, and Square Types.

All Pipes are tapered, slightly reducing inside measurement at one end

SIZES AND DIMENSIONS

Approximate inside measurement at "A"		Dimensions "B"	T
Round Type ..	2in.	[illegible]	[illegible]
" " .	3in.	[illegible]	[illegible]
" " ..	4in.	[illegible]	[illegible]
"	5in.	[illegible]	[illegible]
" "	6in.	[illegible]	[illegible]
Square Type ..	3in. x 3in.	[illegible]	[illegible]
" " .	4in. x 4in.	[illegible]	[illegible]
Rectangular Type	3in. x 2in.	[illegible]	[illegible]
" "	4in. x 2in.	4¾in. x 2¾in.	5/16in.
" "	4in. x 3in.	4¾in. x 3¾in.	5/16in.

TYPICAL ASSEMBLY OF BENDS JUNCTIONS ETC



STANDARD BENDS FOR OFFSETS SHOWN ABOVE

Offset "O"	Length "L" of Top Bend 135° Offset	95° Offset
— 6in.	1ft 3in.	[illegible]
1ft.	2ft.	[illegible]
1ft 6in	2ft 9in.	2ft. 3in.
2ft	3ft 6in.	2ft 9in
2ft [illegible]	4ft	3ft [illegible]
[illegible]	4ft. 9in.	3ft 9in
3ft 6in	5ft 6in	4ft. [illegible]

STRAIGHT PIPES.—Stocked in lengths of 2ft., 3ft., 4ft., and 6ft.

STANDARD BENDS.—135° and 95° as illustrated. Stocked in overall lengths of 3ft. and 6ft. Bends of any degree and length up to 6ft., can be made to order.

STANDARD SHOE BENDS.—135° and 95° as illustrated. Made in overall lengths up to 4 ft. Bends of any degree can be made to order.

JUNCTIONS AND TEES.—Made to order in equal or unequal sizes, as required

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19f

S.A.A. File No.

JAMES HARDIE & COY. LTD.

SOLE MANUFACTURERS OF

"TILUX"—the Marble-finished Wall Panel

FOR BATHROOMS KITCHENS, VESTIBULES, ETC.

SYDNEY, "Asbestos House," York Street
NEWCASTLE: 334 Hunter Street West.
BRISBANE: "Perry House," Elizabeth St.
MELBOURNE: 581-83 Little Collins Street.
PERTH, Rivervale.
NEW ZEALAND: Nathan's Building, Grey Street, Wellington.

WORKS: Camellia, N.S.W.; Brooklyn, Victoria; Rivervale, W.A.
SOUTH AUSTRALIAN AGENTS: Clarkson Ltd., 124 Rundle Street, Adelaide
TASMANIAN AGENTS: F. H. Stephens Pty. Ltd., Hobart and Launceston

Architect's Private File Reference

WHAT "TILUX" IS . . .

"TILUX" is a "marble-finished" wall panel, made solely from indestructible, fireproof materials. It has a smooth, highly-glazed surface that provides all the luxury, charm, and hygienic cleanliness of marble. Yet, it is not an imitation marble. It is distinctly a new creation. Its beautiful, colourful surface, durability and surprising economy make it eminently suitable for innumerable purposes, especially for panelling walls of bathrooms, kitchens, pantries, foyers, vestibules, hallways, restaurants, hospitals, surgeries, shop fronts and counters, shop windows, etc.

"TILUX" not only costs less than tiles, but is fixed in a fraction of the time, at a fraction of the cost. Moreover, it can be fixed to any wall base. Any carpenter can erect it.

Standard Patterns:

"TILUX" is manufactured in six standard patterns, as illustrated on opposite page, viz.:—

Art. 20. Mottled-Grey
Art. 21: St. Anne
Art. 22: Mottled-Red
Art. 23: Pearl-Grey
Art. 24: Dappled-Green
Art. 25: Mottled Blue

Standard Sizes:

"TILUX" PANELS

8ft. x 4ft. 6ft. x 4ft.
8ft. x 3ft. 6ft. x 3ft.

"TILUX" SKIRTING:

6in. and 8in. wide in 6ft. and 8ft. lengths

"TILUX" COVER MOULDING

1½in., 2in., and 3in. wide, in 6ft. and 8ft. lengths

Fixing:

"TILUX" is easily and quickly fixed. Any carpenter can erect it, with ordinary carpenter's tools. It can be readily cut to any desired size or shape with an ordinary hand saw.

In fixing "TILUX," the panels are nailed or screwed to the wall studs or framework, which should be so spaced as to provide a support under the edge of each panel. The panels erected, the joints are covered with "TILUX" Cover Moulding and "TILUX" Skirting, these being attached with 1¼ in. x 9 gauge nickel-plated round head brass screws. The screw holes for the cover moulding and skirting should be drilled—not punched. To ensure a well-balanced appearance, the screws used for attaching the cover moulding and skirting should be evenly spaced at about 12 in. centres.

When fixing "TILUX" to concrete, brick, or stone, the walls should be securely plugged and battened, so as to provide a framework for nailing and screwing under the edge of each panel, and for the skirting. Care should be taken to see that the framework is reasonably true.

"TILUX"

COVER MOULDING AND SKIRTING

"TILUX" Cover Moulding and Skirting is stocked in St. Anne pattern only, as illustrated, but can also be supplied to order in same colour as body sheets.

Unless ordered to the contrary, St. Anne pattern is always supplied.

(Art. 21A)

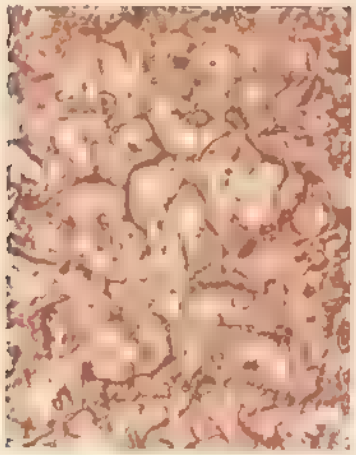
(Art. 21B)

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

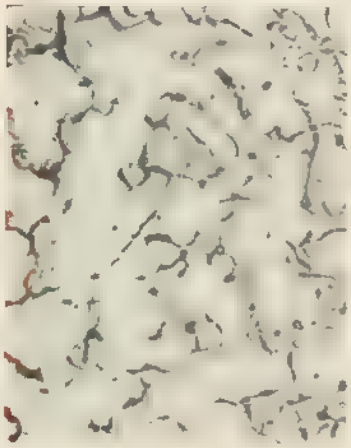
REGISTERED **TILUX** TRADE MARK

THE MARBLE-FINISHED WALL PANEL

STANDARD PATTERNS



ART No. 22
Mottled Red Pattern

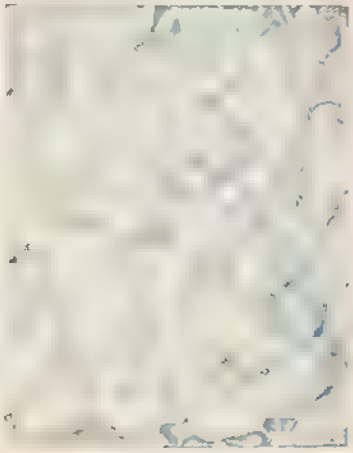


ART No. 20
Mottled Grey Pattern

ART No. 24
Dapped Green Pattern

ART No. 23
Pearl-Grey Pattern

ART No. 21
St. Anne Pattern



ART No. 25
Mottled Blue Pattern

The above illustrations are photographic reproductions made direct from panels of "TILUX." The actual material has a highly-glazed surface, similar to marble.

Samples, illustrated pamphlet, prices, and full particulars posted to any address on request—FREE.

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

Fibrolite

ASBESTOS CEMENT PRODUCTS

For Walls, Ceilings, etc.:

"FIBROLITE" Asbestos Cement Flat Sheets.
"FIBROLITE" Cover and Angle Mouldings.
"FIBROLITE" Ventilators.
"TILUX" Marble-finished Wall Panels.

For Roofing:

"FIBROLITE" Asbestos Cement Tiles.
"FIBROLITE" Corrugated Roofing Sheets.
"FIBROLITE" Gutters and Downpipes
"FIBROLITE" Ridge Cappings.
"FIBROLITE" Skylights.
"FIBROLITE" Roof Ventilators.
"TUSKAN" Tiles.

Miscellaneous:

"FIBROLITE" Barge Mouldings.
"FIBROLITE" Louvre Blades.
"FIBROLITE" Hollow Floor Blocks.
"FIBROLITE" High Pressure Water Pipes.
"FIBROLITE" Conduits for Electric Mains.
"FIBROLITE" Troughing for Steel Pipes, etc.
"FIBROLITE" Electrical Sundries.
"VELOBLAC" School Blackboards

Sole Manufacturers:

James Hardie & Coy. Ltd.

SYDNEY, NEWCASTLE, MELBOURNE, BRISBANE, PERTH, AND WELLINGTON, N Z

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

WUNDERLICH LIMITED

Manufacturers of

DURABESTOS (ASBESTOS CEMENT) BUILDING SHEETS

Administration: BAPTIST STREET, REDFERN, SYDNEY, N.S.W

Showrooms and Offices:

SYDNEY: Baptist Street, Redfern.
STH. MELBOURNE: 210 Hanna Street.
ADELAIDE: Grote and Morphett Streets.
PERTH: Lord and Short Streets.
BRISBANE: Amelia Street, Valley
NEWCASTLE, Builders' Exchange, King St.
HOBART: 139 Macquarie Street
LAUNCESTON: 71 St. John Street

19f

S.A.A. File No

[For Other Products, See Index]

Durabestos — the Rock-like Lining

Durabestos is a rock-hard Asbestos Cement Sheeting, made by Wunderlich Limited at their Cabarita (N.S.W.) and Sunshine (Vic.) Works. It is composed of asbestos fibre and Portland cement, which, by thorough mixture and compression, are united into a homogeneous product, possessing the toughness of the fibre and the hardness of solid concrete.

Stock Sizes and Thicknesses

Durabestos is available in big, broad sheets. There are two standard thicknesses in everyday use, viz.

$\frac{5}{16}$ in., suitable for Walls,
$\frac{3}{8}$ in., recommended for Ceilings.

Numerous sizes are available in each thickness, viz.
4 ft. wide, by 4, 5, 6, 7, 8, 9 and 10 ft. long.
3 ft. wide, by 4, 5, 6, 7, 8, 9 and 10 ft. long.

Weight per Square Yard

The approximate weights of Durabestos Sheets are:— $\frac{5}{16}$ in.: 16.3 lbs. to the square yard, $\frac{3}{8}$ in.: 14.1 lbs. to the square yard.

Exterior and Interior Uses

Durabestos will be found an ideal material for the various purposes previously served by timber linings and weatherboards. Externally, it is used for lining Walls; for Gable fillings, Eaves linings, Balcony panels, etc. In the Interior of buildings it is suitable for lining Walls and partitions, and for Ceilings, Door Panels, etc.

Qualities and Advantages

Durabestos is economical, weather-resisting, fireproof, hygienic, and virtually imperishable. In most parts of Australia it is found to be cheaper than timber, and just as easy to erect. It is really improved by exposure to the weather. Unlike most lining materials, it cannot burn, flake, crumble, rot, corrode, or suffer damage by white ants, borers or rodents.

Method of Fixing

You nail Durabestos to wall studs or ceiling joists, using special blunt-pointed nails, 1 inch by 14 gauge. At all joints the Sheets are butted, NOT lapped, and it is usual to apply wooden cover battens over the joints. Best effects are obtained when cover battens of liberal width and thickness are used. Alternatively, we can supply Durabestos cover strips.

Durabestos is ideal for Exterior and Interior Walls and Ceilings. It is easy to handle and fix.

How to Cut Durabestos

When new, Durabestos may be sawn like timber. A more general method is to score a line deeply with a chisel, along the direction of the desired cut (using a batten or straight-edge as a guide), after which the surplus material may be snapped off.

Decorative Possibilities

The surface finish of Durabestos is as smooth as trowelled cement, and of a pleasing grey colour. This surface lends itself to decoration in colours—when a variation from the natural finish is desired.

Supplies Obtainable Everywhere

In almost every centre of population in the Commonwealth there is a "stockist" of Durabestos Sheets. Supplies are obtainable, also, direct from our own addresses (see list above).

Identification

Being made by the exclusive Wunderlich process, Durabestos Sheets possess extreme density, smoothness and rigidity, due to compression in the course of manufacture. If you value these qualities, make sure you obtain DURABESTOS—the name is marked distinctly on every Sheet.

Special Thicknesses

We make Durabestos Sheets to order in several special thicknesses, comprising $\frac{1}{4}$ in., $\frac{5}{16}$ in., $\frac{3}{8}$ in., $\frac{1}{2}$ in., $\frac{5}{8}$ in., and $\frac{3}{4}$ in. thick. To ensure satisfactory delivery, it is advisable to give us early particulars of sizes required.

"Duratile" for Bathrooms, etc.

"DURATILE" is Wunderlich Durabestos, patterned to look like 4 inch square Tiles. It is made in Sheets measuring 4 ft. by 4 ft., and 4 ft. by 3 ft. An ideal material for lining Bathrooms, Kitchens, etc.

Durabestos Cover Strip

Durabestos Cover Strip is ideal for covering the joints where Durabestos Sheets butt together. It is available with either bevelled or rounded edges in lengths of 6, 7, 8, 9, 10, 11 and 12 feet, in widths of 2 in., $2\frac{1}{2}$ in. and 3 in. Both internal and external Angle Strips for use in conjunction with the Cover Strip are available.

Catalogues and Samples

On request we will supply particulars and samples of Durabestos and Duratile; also a free copy of our book entitled "Durabestos Homes of Colourful Beauty," which illustrates modern Durabestos Homes.

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RAMSAY'S ARCHITECTURAL AND ENGINEERING SPECIFICATIONS

An Australian Specification Manual prepared by the Technical Editor and Staff of Ramsay's Catalogue with the assistance of other architects and engineers, and published by the Ramsay Standard Catalogue Service Pty. Ltd.

TABLE OF CONTENTS.

1. *Notes on the Assembly, Writing and Presentation of Specifications :*
   A practical treatise on the "externals" of the Specification.
2. *Bibliography of Specification Work:*
   A selected list of publications devoted to Specifications and Specification Writing
3. *A Specification Vocabulary :*
   A quick reference to Specification words, of distinct usefulness in the preparation of new paragraphs.
4. *40 Chapters of Actual Specifications :*
   Containing over 3000 distinct and optional paragraphs and items selected and worked up from many sources.
5. *25 Short Form Specifications :*
   Suitable for description of proposed work or for outline Specifications.
6. *A Comprehensive Index*
   Also of value as a Specification checking list.

SEE THE CLOSING PAGES OF THIS CATALOGUE FOR FURTHER INFORMATION

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SECTION I

[Containing S.A.A. Filing Section No. 19]

CARPENTRY AND JOINERY

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

19a

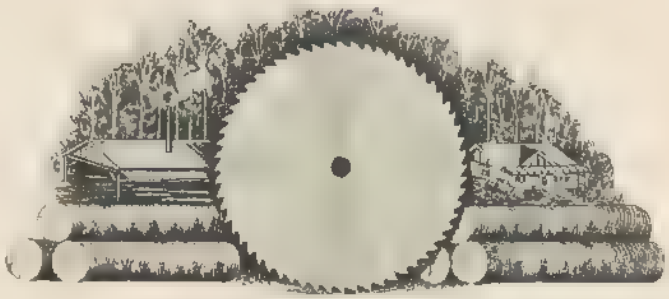
THE ASSOCIATED COUNTRY SAWMILLERS OF NEW SOUTH WALES

UNION HOUSE,
GEORGE STREET, SYDNEY
Phone B 1245

A Complete Service Offered-- North, South or West

The Association

Has been in existence for over 25 years, and has a membership roll covering 120 mills throughout the State, these mills convert every variety of the numerous species of native timber. Central office is in Sydney and branches are established at Grafton and Lismore, while groups and sub-branches have been formed in certain areas carrying special local timbers, such as Hoop and Cypress Pine, Coachwood, Spotted Gum, etc



Service to Architects

Sawmillers and merchants of the Association are prepared at all times to co-operate with the Architect, by way of information or assistance, as to the class and quantity of timber available, and as to any special features of the local trade Owing to variation in climatic conditions caused by elevation or distance from the coast, the degree of humidity in the atmosphere must be reflected in the moisture content of the timber to be used For instance, a moisture content of, say, 12 per cent. in building timbers on the sea coast, which is about normal, would not be satisfactory for inland districts, where humidity is low, and moisture content more like 8 per cent.

In these and similar matters which are of purely local knowledge, every co-operation and assistance by the sawmiller is readily granted

AUSTRALIAN TIMBERS

Are known the world over for their great strength and durability, and general resistance to dry rot, pests and decay. They are unsurpassed for use in their native conditions, whether in dry or humid districts, and for this reason alone are to be preferred to any imported timbers which are not always so adaptable.

Advantages

The advantages of adopting the native article are mainly those of convenience, economy, durability and service; when special sizes or unusual patterns are called for, local mills and yards are equipped and ready to meet the demand

Whilst standardisation in sizes and patterns is becoming more systematic day by day, the special desires of the Architect for more efficient or artistic finish are received and considered with every attention

Range of N.S.W. Timbers

Early colonists found, in the coastal belt, widespread timbered areas capable of supplying all requirements for structural and decorative purposes. Further inland, where hardwoods were not so plentiful, the availability and the structural qualities of Cypress Pine were found to be of great service in all forms of building work.

In short, wherever colonisation was effected, man's building timbers were found to be at hand

With local sawmills established in every country town in the coastal areas, and with inland distribution depots and yards able to cope with all normal requirements, native timbers of all kinds are always available, in quantity and quality to suit all needs, within easy reach throughout the State

The more important timbers of New South Wales have been roughly classified as set out in the following tables, which indicate the wide variety available. Some recommended applications as to the various timbers are also shown for general guidance

A.—HARDWOODS

1. **Ironbarks**
2. **Stringybarks**
3. **Light-Colored Hardwoods**
   - (a) Blackbutt
   - (b) Brush Box
   - (c) Grey Box
   - (d) Mountain Ash
   - (e) Spotted Gum
   - (f) Tallow wood
   - (g) White Mahogany
4. **Red Hardwoods**
   - (a) Forest Red Gum
   - (b) Grey Gum
   - (c) Murray Red Gum
   - (d) Red Ironbark
   - (e) Red Mahogany
   - (f) Sydney Blue Gum
   - (g) Turpentine

B.—FIGURED AND SOFTWOODS.

1. **Cedar and Beech**
   - (a) Brown Beech
   - (b) Red Beau
   - (c) Red Cedar
   - (d) Rosewood
   - (e) White Beech
   - (f) White Cedar
2. **Pines**
   - (a) Hoop or Colonial Pine
   - (b) Cypress Pine
3. **Oaks**
   - (a) Red Silky Oak
   - (b) Silky Oak
   - (c) She Oak
   - (d) Honeysuckle
4. **Blackwood, Etc.**
   - (a) Black Bean
   - (b) Myall
5. **Miscellaneous Brushwoods**
   - (a) Bolly Gum
   - (b) Blueberry Ash
   - (c) Blue Fig
   - (d) Coachwood
   - (e) Crabapple
   - (f) Cudgerie
   - (g) Maiden's Blush
   - (h) Native Teak (Flindersia)
   - (i) Pigeonberry Ash
   - (j) Red Ash
   - (k) Sassafras
   - (l) White Ash
   - (m) Yellowwood or Long Jack

(Continued on next page

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FEATURES OF NEW SOUTH WALES HARDWOODS

Strength

Section for section, our Hardwoods stand alone, in all strength tests applied by experts and scientists. It follows that building practice allows smaller sections to be used, while security is retained The economy of this is obvious. Not alone in Hardwoods is this quality to be found; Hoop Pine is stronger, section for section, in transverse strength, than imported Douglas Fir, and many of the scrub timbers, comparatively little known, have special qualities of strength which bring them into favour amongst users, against even the well known hardwoods

One excellent illustration in this respect is that of Coachwood, which is commercially available for a multitude of purposes; its lightness, toughness and rich appearance commending it for furniture, body-building and many decorative uses.

Proof of the capacity of Hardwoods is shown in scientific tests applied All the recognised hardwoods in general use show a breaking strain running from 6,000 lbs to over 9,000 lbs. in a section 3 ins. x 3 ins. at 38-in centres, and this is coupled with a density showing weights from 58 to 65 lbs per cubic foot.

Durability

Instances can be quoted freely of timbers, put into use by the early colonists, being in perfect condition after long periods, some of the early homesteads for over a hundred years. In many cases there has been no attempt to preserve such materials by means of paint or preservative of any kind. Heavy construction, such as bridges and various forms of railway construction, wharves and jetties, all exposed to the severest climatic conditions, give clear proof, wherever examined, of the long life and resistance to decay, of these timbers.

Resistance

Decay and dry rot are slow in taking effect upon native timbers, and with proper attention to painting there is no limit to the life of the structure Most of the hardwoods contain properties which act as preservatives, for example, Tallowwood carries an essential oil which remains in the timber indefinitely, and is found in timber re-cut after a score of years.

RECOMMENDED APPLICATIONS OF NEW SOUTH WALES TIMBERS

Application or Use.	Recommended Sizes.	Recommended Timbers.
Ground Plates and Bearers	4, 5, or 6in. x 3in.	General Hardwoods, including Grey Gum, White Mahogany, Woollybutt, Blackbutt, Tallowwood, Stringybark, Spotted Gum, Blue and Red Gum, and Ironbark.
Top Plates	3 or 4in. x 3in.	
Floor Joists	4 or 5in. x 2in.	
Studs . . .		
Ceiling Joists .		
Rafters	3 or 4in x 2in.	
Collar Ties and Trimmers .		
Battens ..	3 x 1in. or 3 x 1¼in.	Hoop Pine, Blackbutt, Blue Gum, and the lighter hardwoods.
External Flooring ..	3 and 4in. wide x 1in. to 1¼in. thick.	Tallowwood, Mahogany (red and white), Spotted Gum, Blue Gum, Ironbark, etc.
Internal Flooring .	3, 4, and 4½in. wide x 1in. to 1¼in thick.	Hoop Pine, Cypress Pine, Brush Box, Beech, Teak, Cudgerie, and the lighter hardwoods.
Weatherboards and Chamfers—plain or feather-edge . ..	6 and 7in. x 1in.	General Hardwoods, including Red and White Mahogany, Tallowwood, Blue Gum, Spotted Gum, Ironbark, etc.
Linings, Ceilings and Partitions	⅜in. to 1in. in thickness, by various widths; patterns standard or special.	Hoop Pine, Yellowwood, Bolly Gum, Cudgerie, Red and White Mahogany, Spotted Gum, Red or Blue Gum, Blackbutt.
Internal Furnishings, Panelling, etc.	Various sizes for Mouldings, Panels, etc.	Hoop Pine, Rosewood, Red Bean, Yellowwood, Bolly Gum, Cudgerie, Beech, Red Mahogany, Sassafras, Silky Oak, Cedar, Coachwood, Blue Fig, and the lighter coloured hardwoods.

Suitability

While timbers are available for every purpose, it is desirable that consideration be given to certain features of the different varieties and their applicability to the requirements of the job.

Local knowledge is a valuable help in such cases. For some time past the matter of seasoning and preparation of timbers to be used where shrinkage must be avoided has received careful attention, and in floorings and linings in particular the best methods of drying have been sought Air drying, and in many cases the levelling up by kiln treatment, have been properly developed until guarantees of moisture content can safely be given, and many of the timbers previously regarded as unsatisfactory have consequently come prominently into use. For example, Brush Box as a flooring, formerly neglected, has come into favour to such an extent that mills making a feature of it have greatly increased their capacity and output. Properly treated and selected, it is amongst the best of materials, its light colour making it attractive in appearance, and its capacity to withstand wear and tear making it first choice for factory or heavy service work

Requirements for Ordering and Specifying

It is desirable in most cases before specifying or ordering native timbers, to enquire as to, and if possible inspect, the stocks of such timbers available. Not every timber is suitable for special conditions or treatment; and while it may be said that broadly, the local timber is adapted for local use, there are certain positions in a building for which particular timbers are more desirable than others. On this matter the special knowledge gained by the sawmiller or local builder is of service.

When drawing specifications consider the purpose for which the timber is intended, and its position in the building; whether to be in contact with the ground or otherwise; whether decorative figure is required, etc.

When ordering, give choice of lengths; for example, floor joists allow breaks on certain bearers and plates Alternative lengths will help to expedite delivery, and while little trouble to the buyer, is a convenience to the miller

When random lengths or running measurement will suffice, order in that way; special lengths are not always necessary.

Flooring which is not to be polished or left uncovered need not be spotless on all sides; limited defects in appearance will not be detrimental. Strength and reliability of service are the essentials, and all native timbers possess these. For whatever purpose the timber is required, a grade will be found to suit

Grading

Steady progress continues to be made, with the backing of the Standards Association of Australia co-ordinated with research efforts of the Economic Botanist of the Technological Museum in Sydney, towards the development of efficient and uniform rules of grading, in which important work Architects, Builders, Distributors, Government Departments and Sawmillers are freely and unreservedly exchanging and collating their views and expressing them in concrete form.

Uniformity in this matter is the special objective, and already a general understanding on the question, not only within the State, but all over the Commonwealth, is well within sight.

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19*a*

S.A.A. File No.

THE HARDWOOD MILLERS' ASSOCIATION
OF VICTORIA

312 FLINDERS STREET, MELBOURNE

Telephone: Central 10666 Manager's Residence: W 5174

MASTER HMV BRAND

SEASONING AND TREATMENT OF HARDWOODS

The Hardwood Millers' Association of Victoria has made a completely successful job of kiln seasoning and handling our native timbers. Architects, builders and consumers of timber can now recognise our registered brands as being the semblance of quality and standardisation. The aim in seasoning timber is, without causing checking, and case-hardening, to dry the timber to a definite, fairly low, uniform moisture content such that there is practically no tendency for the timber to lose or gain moisture when exposed to air during manufacture or use. We therefore guarantee our branded kiln dried products to "stay put."

WARNING.—Our efforts to produce highly selected quality timber is being seriously affected by obnoxious trading methods by which timber is often sold as kiln dried when it is not. It often happens that partly air-dried timber is substituted because it is cheaper. Both practices are entirely unsatisfactory and dishonest.

Our Organisation is at the disposal of all concerned to check obnoxious trading, and we invite enquiries from all who need advice as to the safest brands and the most suitable timbers to use, and we issue a warning that there are many inferior lines that are being offered at reduced prices which are far from being a scientific production.

As it has taken years for us to build up the reputation of our hardwood products, we are anxious to protect our good name as well as our customers, and therefore invite your co-operation.

VICTORIAN HARDWOODS

Every Pound's Worth of Victorian Timber Used will make Victoria a Pound Better Off

Herein we briefly set out some useful information for the guidance of Architects, Engineers, and Builders in the general use of Victorian hardwoods

The principal marketable timbers produced are set out in the table of working stresses and can be produced in any required size in lengths up to 50 feet. No difficulty will be experienced in procuring large sizes in long lengths if orders are given in reasonable time.

Hardwood can be produced in any size for building construction, bridge construction, concrete formwork, scaffolding, fencing, etc. The various species of Victorian hardwood have their respective uses, and some are unequalled for use in or on the ground or water work. We will be pleased to recommend the most suitable

Strength of Victorian Hardwoods

It is not generally recognised that in the hardwoods of Victoria there are some of the most remarkable timbers in the world from a strength standpoint. These are so strong for their weight, that they might be regarded as the optimum arrangement of wood substance, to give high strength properties without too great a density. That this has been overlooked, and that general use has not been made of the valuable structural properties of the timbers, have been due to the fact that strength data have not been available in a form suitable for the architect. To remedy this the following tables of working stresses for ordinary building construction have been prepared after a thorough investigation of all available strength data on these timbers

For convenience the timbers have been divided into two groups, and while naturally the strengths vary somewhat in the species within a group, the figures given are safe for any of the timbers. This grouping will have an additional appeal to the architect, for appearance and conditions of supply of the timbers are such that while there might be misidentification of the timbers within a group, there need be no fear of supply of timbers of the weaker group in mistake for those of the stronger, to the detriment of design.

Group A—

Mountain Ash (E. regnans).
Red Ash or Woollybutt (E. gigantea).
Messmate (E. obliqua).
Silvertop (E. sieberiana).
Brown Stringybark (E. capitellata).
Red Gum (E. Rostrata).

Group B—

Blue Gum (E. globulus).
Yellow Stringybark (E. muelleriana).
White Stringybark (E. eugenioides).
Mountain Grey Gum (E goniocalyx)

Working Stresses for Victorian Hardwoods

Type of Stress.	Group A.	Group B.
Bending	2,000 lbs./sq. in.	2,500 lbs./sq. in.
Struts—		
$\frac{L}{D}$ less than 10	1,200 lbs./sq. in.	1,500 lbs./sq. in.
$\frac{L}{D}$ 10 to 25	$1,400-\frac{20L}{D}$ lbs./sq. in.	$1,700-\frac{20L}{D}$ lbs./sq. in.
Bearing—		
Across grain	450 lbs./sq. in.	550 lbs./sq. in.
End grain	1,500 lbs./sq. in.	2,000 lbs./sq. in.
Shearing—		
Horizontal shear in beams	170 lbs./sq. in.	210 lbs./sq. in.
Shear in Joint Details	250 lbs./sq. in.	320 lbs./sq. in.
Tension	2,000 lbs./sq. in.	2,500 lbs./sq. in.
Modulus of Elasticity	2,000,000 lbs./sq. in.	2,500,000 lbs./sq. in.

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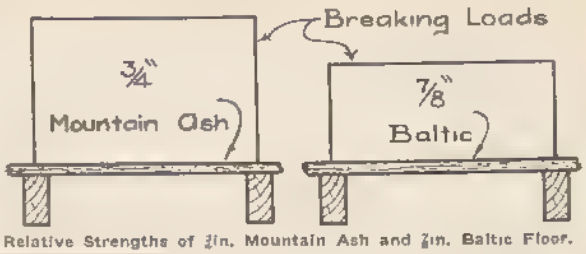
The strength and stiffness of the Victorian hardwoods will permit the use of smaller sections of timber, so that the disability of greater weight can largely be avoided. An example of this is the fact that a ¾in. Mountain Ash floor has more than 50 per cent. greater strength than a ⅞in. Baltic floor, and even exceeds the strength of a 1in. Baltic floor. (See opposite diagram.)

Hardwood has nearly twice the breaking strain of Oregon, it is more resistant to insect destruction or fire, and has double the life.



Relative Strengths of ¾in. Mountain Ash and ⅞in. Baltic Floor.

KILN-SEASONED HARDWOOD: A RELIABLE PRODUCT

During the last few years there has been a steady increase in the adoption of kiln-seasoning by Victorian sawmillers, and the present output of which Victorian kiln-seasoning plants are capable is approximately 34,000,000 super feet per annum.

Not only has the number of seasoning plants increased, but there has been a sincere effort to improve existing practice. Old kilns have been modified, stacking has been improved, and regular testing of the finished product has, in many plants, supplanted the old method of judging the quality of the kiln dried product by its appearance.

The consequent improvement in the attractiveness and quality of such lines as hardwood flooring, lining, joinery and furniture stocks is marked.

Reconditioning Warped Timber

One of the biggest factors contributing to this improvement has been the widespread adoption of a treatment for reconditioning collapsed and warped timber. Discovered and developed in Victoria in the first instance, this treatment has such tremendous advantages that it has attracted world-wide interest. It has been used in the U.S.A.; its application to certain English timbers is being investigated in England, and it is now being adopted throughout the Commonwealth of Australia. It is carried out as an adjunct to kiln-seasoning, and consists of a final steaming treatment, during which warped boards straighten and boards exhibiting uneven shrinkage, commonly known as collapse, regain a full and regular shape. The changes produced are permanent, and not only is the resultant product much more useful and attractive, but the timber becomes much easier to work, while not being reduced in strength. Further, timber which has been reconditioned does not shrink or swell with changing climate conditions to the same extent as does timber which has not been reconditioned.

Reliability

The net result of this progress in the seasoning and reconditioning of Victorian hardwoods is that it is now possible for the architect or builder to obtain supplies of timber on which he can rely absolutely, and which in appearance and utility is unsurpassed.

All the kiln-dried productions of our members are branded with the registered trade mark or brand of the individual member in addition to the Association's brand "H.M.V." The latter will signify that the production is properly standardised in size, machining, quality, and seasoned to the correct formula. Hence, all lines bearing the additional brand "H.M.V." will match and compare in every detail and carry the thorough recommendation of the Association.

Standard Sizes of Kiln-Dried Hardwood Productions

Flooring, selected quality 3¼ x ⅞.
Flooring, selected quality—4¼ x [illegible]
Flooring, merchantable quality—5¼ x 13/16.
(in place of Baltic)
Lining, selected quality 3¼ x 7/16; 4¼ x 7/16; 5¼ x 7/16.
Lining, merchantable quality 3¼ x 7/16; 4¼ x 7/16, 5¼ x 7/16
Weatherboards—6½ in., round edge or bank pattern.
Architraves, Skirtings, Mouldings, etc., in trade patterns and sizes.

All kiln-dried timbers are cut on the quarter from sound matured logs.

ARCHITECT'S SPECIFICATION FOR HARDWOOD-FRAMED DWELLING

NOTE.—Only the more important items have been included.

GENERAL.

All timber shall be the best of its respective kinds, properly seasoned and free from large, loose and dead knots, shakes and sap, and to be of the full size specified. Exposed timbers shall be properly dressed for painting.

SOLE PLATES AND STUMPS.

Sole Plates and Stumps shall be red gum, and obtained from the mills of a member of the Hardwood Millers' Association of Victoria.

Sole plates, 9 x 9 x 1½ in. (or 9 x 6 x 1½ in.). Stumps, 4 x 4 in., spaced at 4 ft. centres.

FRAMING TIMBERS.—All framing timbers, joists, studs, rafters, purlins, braces, etc., shall be.....(state kind of hardwood desired) obtained from the mills of a member of the Hardwood Millers' Association of Victoria. Sizes and construction shall be as follows.—

FLOOR FRAMING.—Plates and bearers, 4 x 3 in. on edge, spaced at 4 ft. (or not more than 6 ft.) centres. Floor joists, 4 x 2 in., spaced at 18 in. centres. Plates and bearers in long lengths scarfed jointed at corners and joints.

WALL FRAMING.—Vermin and top plates, 4 x 2 in. Studs, 4 x 2 in. (or 4 x 1½ in.) spaced at 18 in. centres, checked ⅜ in. into plates, and braced with 3 x 1 in. diagonal bracing let into studs. Corner and door studs, 4 x 3 in. (or 4 x 2 in.). Heads to openings up to 4 ft. wide, 4 x 2 in; over 4 ft. wide, 6 x 2 in. on edge.

CEILING FRAMING.—Ceiling joists, 4 x 2 in. (or 4 x 1½ in.) Hanging beams, 10 x 2 in. (or 9 x 1½ in.) spaced at 6 ft. centres. Joists hung to hanging beams with 2 x 2 in. (or 1½ x 1½ in.) fillets.

ROOF FRAMING.—Rafters for tile roofs, 5 x 1½ in. (or 4 x 2 in.) spaced at 18 in. centres; for iron roofs, 4 x 2 in. (or 4 x 1½ in.) spaced at 3 ft. centres. Rafters cut plumb at ridge, notched at plates and nailed to sides of joists.

Purlins, 4 x 3 in.—two rows to be provided when rafters exceed 20 ft. in length. Struts and braces, 4 x 3 in. (or 4 x 2 in.) Collar ties, 4 x 2 in. (or 4 x 1½ in.) to each alternate pair of rafters.

Ridge, hips and valleys, 9 x 1½ in. (or 8 x 1½ in.). Valley boards, 1 in. thick. Battens for tiles, 2 x 1 in.; for iron, 3 x 1½ in.

Barge boards, 9 x 1½ in., with [illegible] bed moulds under tiles.

BASE BOARDS.—Lining from floor to ground line, 6 x 1 in. hardwood; top board chamfered and dressed.

EAVES SOFFIT.—Overhanging rafters shall be back-lined with 5¼ x ⅞ in. T. & G. merchantable quality..... brand kiln-dried hardwood, bearing the miller's brand and the initials "H.M.V." Bird board of 6 x 1 in. hardwood, cut in between rafters.

Gable soffit to be similarly lined, and have [illegible] mould at intersections.

FLOORING, LINING AND WEATHERBOARDS.

HARDWOOD FLOORING.—The flooring to the following rooms shall consist of (a) 3¼ x ⅜ in.—(b) 3¾ x ⅜ in.—(c) 4¾ x ⅜ in. (d) 4¾ x ⅜ in.—T. & G. selected quality (or 5¼ x ⅜ in. T. & G. merchantable quality).....brand kiln-dried hardwood, bearing the miller's brand and the initials "H.M.V."

NOTE.—State location of flooring.

Flooring shall be well cramped up and double-nailed at each bearing.

LININGS.—Linings to the following compartments, rooms, etc., shall consist of (a) 3¼ x ⅜ in. (b) 4¾ x ⅜ in.—(c) 5¾ x ⅜ in.—T. & G. V-jointed selected quality (or merchantable quality) .....brand kiln-dried hardwood, bearing the miller's brand and the initials "H.M.V."

NOTE. State location of compartments, etc., that are to be lined.

WEATHERBOARDS.—All weatherboards shall be 6½ in. round edge ....brand kiln-dried hardwood, bearing the miller's brand and the initials "H.M.V."

Weatherboards shall be securely punched, nailed to studs, lapped 1¼ in., and butted to 2 x 1 in. corner stops.

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

19*d*

S.A.A File No.

VICTORIAN HARDWOOD CO.

PTY. LTD.

OFFICE:

422 CHANCERY LANE, MELBOURNE

MILLS AND KILNS:

POWELLTOWN, VICTORIA

V.H.C.

ADA RIVER

Kiln Dried Reconditioned Hardwood

The hardwood used for the milled products of this company (the largest sawmilling organisation in the State) is Victorian mountain ash (eucalyptus regnans). Every step in the production of the V.H.C. and Ada River brands of floorings and linings—from hewing the timber to the milling of the finished piece—is under direct control based on the best practice in logging and scientific methods of seasoning; so accurate also is the control in the kiln drying and reconditioning processes that all products are guaranteed as to moisture content—12 per cent. being the most consonant with the generally prevailing atmospheric conditions of Southern Victoria. Timber of any kind exposed to the atmosphere will, by reason of absorption, always contain some degree of moisture. If over-dried or "baked" it will expand by absorption of moisture, and if unsufficiently dried it will shrink by evaporation. Some recent comparative tests of deflection and breaking strains of floor boards available in the Melbourne market have brought forth the simple facts that kiln dried reconditioned mountain ash shows less **deflection and greater breaking strain** than air dried mountain ash, and that, whether kiln dried or air dried, mountain ash shows **great superiority** as to both breaking strain and deflection over all other species in the tests, which included the following timbers.—Baltic, Jarrah, Pine, Hoop Pine, Radiata, etc.

Two Grades

There are two grades of Victorian Hardwood Co's products (See drawings below for sizes available)—V.H.C (known as **specially selected**) are from quarter sawn boards, one clean face, free from all defects other than very small gum veins; individual lengths not to exceed three inches with combined lengths not to exceed one inch per square foot of board area.

Ada River (known as merchantable) same as V.H.C. brand in all respects, but may contain tight gum veins up to 3/32 in. wide such that the combined length of gum veins shall not exceed 36 in. per sq. ft. of face area of the board, but in 20 per cent shall be allowed 9 ft. of combined length of gum veins to sq. ft. of area of the board

V.H.C brands are recommended for all first-class work as in homes, apartment houses.

Ada River brand may also be used with satisfaction in similar buildings. Although its price is considerably lower than that of V.H.C. brand its difference lies principally in appearance rather than in quality of the timber

The Laying and Care of Stock

A high standard has been attained by our products as the result of careful study and application of the correct methods of cutting, seasoning and milling, but no precaution on our part can ensure the best results unless the timber receives fair treatment after it leaves the mill. We, therefore, suggest in the following paragraphs certain simple precautions with regard to transport, storage and laying of our boards.

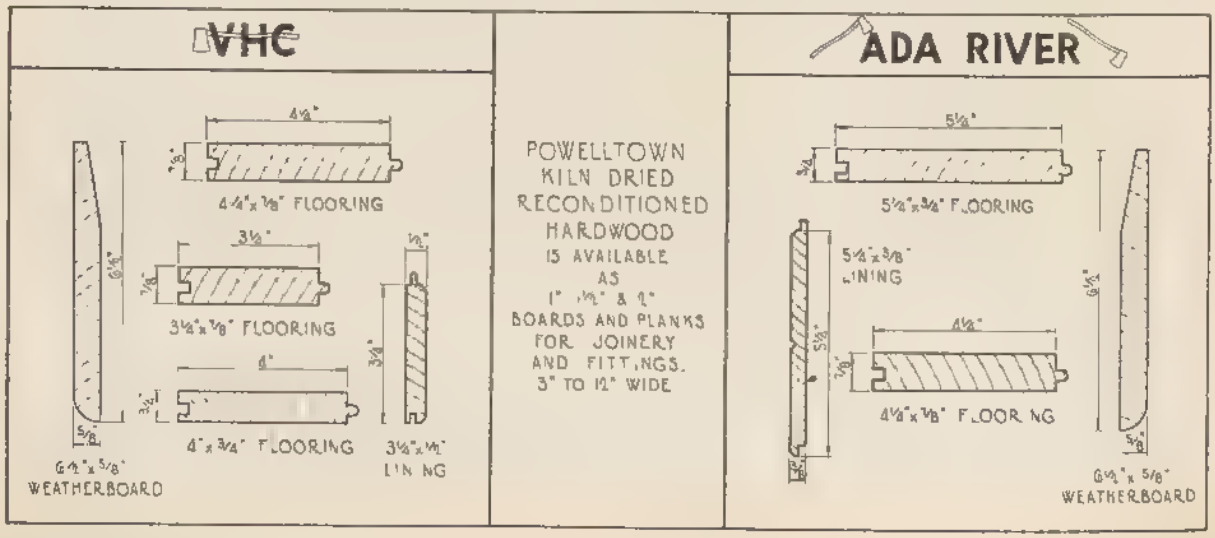
TRANSPORT AND STORAGE. The boards must be protected from the weather during transit and after delivery to the building site. On arrival at the site the boards should, until used, be stacked under a roof if possible.

DRY FOUNDATIONS.—The floor must not be laid on wet joists or immediately above wet concrete. The inevitable result of such treatment will be that properly seasoned boards will absorb moisture and will buckle or push the walls out of alignment

VENTILATION.—If there is not reasonably sufficient ventilation beneath the floor the humidity will be correspondingly high, with consequent absorption of moisture and buckling of boards.

DAMP WALLS.—Flooring should not be laid tight up to the walls, particularly in a brick building. It is advisable to leave a small margin right around the room to be covered by the skirting and quadrant. This will allow for any expansion due to proximity of the boards to damp brickwork.

CRAMPING.—Users are advised that the boards should be cramped only so that they are comfortably tight. If the utmost pressure is used in cramping the slightest expansion, due to humidity of the climate where the floor is laid, will adversely affect the whole floor, as no room whatever will have been allowed for any such expansion



From the collections of Sydney Living Museums / Historic Houses Trust of NSW

19

S.A.A. File No.

THE KAURI TIMBER CO. LTD.

Office: 17 QUEEN ST., MELBOURNE TELEPHONE: CENT. 1508 & 1509

Saw Mill: White Street, South Melbourne
TELEPHONE: M 2246

19

S.A.A. File No.

Products

New Zealand Kauri Pine. For floorings, linings, interior trim, joinery, sink boards, vats, etc.

New Zealand Rimu Pine. For floorings, linings, interior trim, joinery, etc.

New Zealand White Pine. For shelvings, built-in kitchen furniture, etc.

Western Australian Jarrah.—For constructional timbers, floorings, fencing, etc.

Sold by

The chief timber merchants carrying well-assorted stock for immediate delivery.

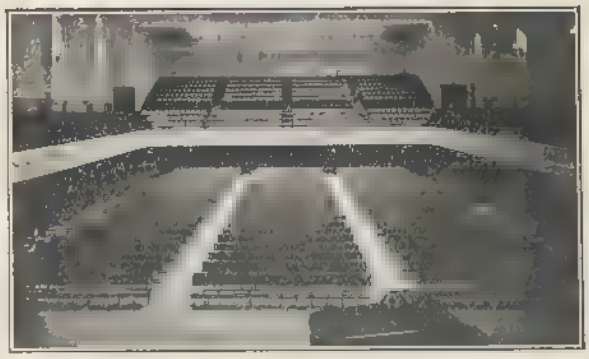
All timbers supplied by the Kauri Timber Co. Ltd. are guaranteed to be true to their botanical names, and, due to the heavy stocks carried, customers can rely upon obtaining seasoned timber as required.

Co-operative Service

The Kauri Timber Co. Ltd. assists architects, builders and carpenters in all matters pertaining to the use of its timbers.

New Zealand Kauri Pine

New Zealand Kauri Pine has a world-famous reputation due to its workable character, light weight, soft lustrous texture, fine grain and freedom from knots. It is known all over Australia, and has received marked preference among architects, builders and carpenters who desire a timber having outstanding qualities in durability, appearance, and the advantage of being successfully used for many purposes.



Melbourne Town Hall floored with N.Z. Kauri Pine, first quality

GRADES

First Quality. — Is all heart, free from shakes or gum veins.

Second Quality. Is all or any part clean sap, free from pin holes.

Third Quality. Is all or any part sap, with pin holes.

SIZES

T. & G. Floorings

First Quality. 4 x 1½, 5½ x 1, 2½ x 1½, 6 x ⅞, 4 x ⅞ in.

Second Quality. 4 x 1½, 6 x ⅞, 4 x ⅞ in.

Linings—T. & G., Rebated, V-jointed or Beaded. — First and Second Qualities.—6 x ⅝, 4 x ⅝ in.

Boards.—All sizes from 3 x 1 in. up to 36 x 6½ in.

Turnery Squares. 2 x 2, 3 x 3, 4 x 4, 4½ x 4½, 5 x 5, 6 x 6 in.

New Zealand Rimu Pine

N.Z. Rimu Pine is a clean straight-grained timber free from knots. It has good durability and being sold at reasonable rates it is now rapidly replacing Baltic timbers. It will readily take any paint, varnish or stain finish, and, for these reasons, it can be safely used for interior trim and joinery when a good, moderately-priced timber is desired. It is extensively used for floorings, and it is to be recommended for use in place of Baltic flooring on account of its superior durability, appearance and absence of knots.

GRADES

First Quality.—Is sound timber, being heart and/or sapwood, free from shakes, gum veins or knots.

Second Quality. Is sound timber, being heart and/or sapwood, free from shakes or gum veins, but may contain sound knots.

SIZES

T. & G. Floorings.—First quality.—4 x 1½, 6 x ⅞, 4 x ⅞ in.

Linings, T. & G., Rebated, V-Jointed or Beaded. First quality 6 x ⅝, 4 x ⅝, 4 x ½ in.

Boards.—2 to 7 x 1 to 2 in., 8 to 11 x 1 to 2 in., 12 x 1 to 2 in., 14 x 1 to 2 in., 16 x 1 to 2 in., 18 x 1 to 2 in.

New Zealand White Pine

N.Z. White Pine is a clean, white timber invariably used for shelvings, kitchen furniture, and table tops. It is ideal for these uses, as it speedily works and dresses, keeps its clean, white appearance, and may be repeatedly scrubbed without showing signs of discolouration. Architects should always specify it for their details of built in kitchen furniture.

GRADES

First Quality is sound timber, being heart and/or sapwood, free from shakes or gum veins, but may contain one sound knot if not more than 1 in. diameter to every 6 superficial feet.

Second Quality is sound timber, being heart and/or sapwood, free from shakes, but may contain sound knots and/or gum veins of not more than ⅛ in. wide.

SIZES

2 to 4 x 1 to 2 in., 4½ to 7 x 1 to 2 in., 8 to 11 x 1 to 2 in., 12 x 1 to 3 in., 14 x 1 to 3 in., 16 x 1 to 3 in., 18 x 1.

Western Australian Jarrah

This fine Western Australian hardwood is of a red colour, hard, heavy and dense in texture with a slightly waving grain. It works smoothly and takes a good polish. Jarrah possesses a high degree of durability (both in and out of the ground), resists the attacks of the teredo and white ant, and is almost non-inflammable. Jarrah flooring is exceedingly durable in exposed positions.

GRADES

Select.—Straight grained, well sawn, free from sap or wane, knots, shakes or heartwood.

Merchantable. Sound, strong timber, well sawn to size, free from heart timber and defects that naturally impair its strength.

Dry Boards and Flooring. Dressed from sound timber well sawn to size, free from heart timber, gum pockets or wanes, but may contain firm gum veins.

SIZES

Scantlings:—In inches—

3 x 1½, 3 x 2, 3 x 3
4 x 1½, 4 x 2, 4 x 3, 4 x 4
5 x 1½, 5 x 2, 5 x 3, 5 x 4, 5 x 5
6 x 1, 6 x 1½, 6 x 2, 6 x 3, 6 x 4, 6 x 6,
7 x 2, 7 x 3, 7 x 7
8 x 1½, 8 x 2, 8 x 3, 8 x 4, 8 x 6, 8 x 8
9 x 1½, 9 x 2, 9 x 2½, 9 x 3, 9 x 4, 9 x 6, 9 x 9
10 x 2, 10 x 2½, 10 x 3, 10 x 10
11 x 2, 11 x 2½, 11 x 3
12 x 12 x 3, 12 x 4, 12 x 6, 12 x 8, 12 x 9, 12 x 10
12 x 12

T. & G. Floorings.—4 x 1½, 3½ x 1½, 4 x ⅞, and 3½ x ⅞ in. Palings 6 x ½ in.; pickets, 3 x 1 in.; battens, 2 x 1, 3 x 1 in.

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

19	THE VANIKORO KAURI TIMBER CO. PTY. LTD.	VANIKORO KAURI
S A File No	OFFICE: 501 LITTLE COLLINS ST., MELBOURNE TELEPHONE: F 1016 STORAGE YARDS: LORIMER ST., WHITE ST., JOHNSTON ST. SOUTH MELBOURNE TELEPHONE M 1016	

VANIKORO KAURI PINE

Facilities and Supply

The company possesses the exclusive rights over a huge tract of virgin Kauri Pine forest located in the British Solomon Islands This Kauri forest of Vanikoro is one of the largest in existence, and provides the company's mills in Australia with millions of feet annually thus ensuring a steady supply available for years to come All timber is shipped in logs to Australia when it is milled and dressed

All the leading local timber yards can supply your orders Should you have any difficulty in obtaining your requirements, or desire any further information, your enquiries will be welcomed by us.

Users of Vanikoro Kauri

Furniture (all classes).—It works well and polishes

Flooring.—Clean, clear and fast. Excellent for dancing and hard wear

Joinery, Doors, Windows and Interior Trim, etc. It stains readily to represent any desired timber

Sink Draining Boards, Wash Troughs, Liquid Containers, Brewers' Vats and Casks. It will not peel, blacken, rot, leak or taint

Shelving Dresses readily.

Turnery.—Can be worked both with and against the grain

Boat Building and Deck Planking. Classed A1 at Lloyds

Characteristics

Soil, altitude and climatic conditions combine to produce wood in the Vanikoro Kauri Pine tree that is practically identical with the world-famous Kauri of New Zealand This similarity is so marked that timber experts have declared their inability to recognise any appreciable difference in the growth of the forests, or detect any difference in the appearance or quality of the milled timber. You therefore may be assured that Vanikoro Kauri can be used for all purposes for which N Z. Kauri is used

The chief characteristics of Vanikoro Kauri Pine are as follows

Beauty.—Vanikoro Kauri is of fine appearance, whitish yellow in colour, having a silky softness and a fine, close grain free from defects

Texture —Its high class mild, clean texture, and absence of knots renders it easy to work On account of its close grain it can be planed across the end grain as well as with it Thus it is an ideal timber for turnery

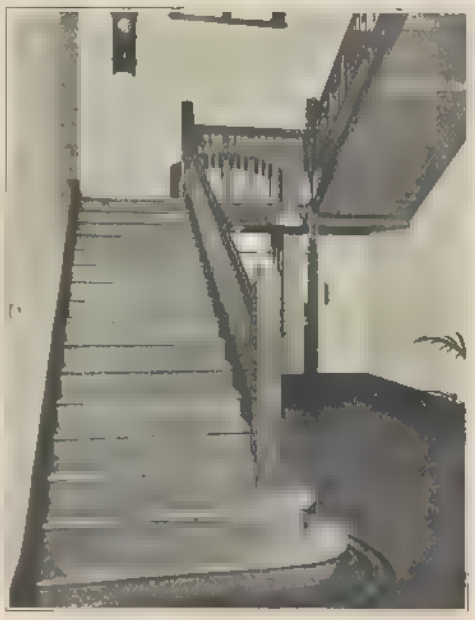
Durability. Vinokoro Kauri wears well as evidenced by its use for boat decking—one of the most exacting tests to which any wood is put, requiring not only great durability and strength, but resistance to rot and weather as well It has been specially recommended and specified by Lloyds for internal fittings and woodwork

Another well-known test for the durability of Kauri is its adaptability for Vat work and casks where acids must not percolate Before the introduction of Vanikoro Kauri, no other Kauri (other than New Zealand) could withstand this extreme test

ADVANTAGES OF VANIKORO KAURI

Beauty of grain, durability, ease of working, adaptability to a wide range of finishes, unlimited supply, high grade and moderate cost combine to make the Vanikoro Kauri Pine one of the best general utility timbers.

Vanikoro Kauri has been tested by a number of leading architects and specified by them for use in public and private building contracts. In all cases it has given complete satisfaction.



Vanikoro Kauri Staircase in the Rosanna Convent. Architect: Robert Harper

Finishes

The ease with which Vanikoro Kauri adapts itself to a wide range of colour effects is one of its most valuable features as a joinery and trim wood. Oak, mahogany, walnut, maple, Jacobean and many other effects are easily obtained.

Qualities

Super Quality.—Is guaranteed all clean heart, free from sap, knots, shakes or gum veins.

First Quality.—May be all clean heart, or heart and part clean sap, free from knots, shakes or gum veins.

Second Quality.—Is heart and any part sap, but many contain knots and small pin holes

How Available

Floorings, T. & G.—2½ x ⅞ in., 4 x ⅞ in., 6 x ⅞ 2½ x 1½ in., 3½ x 1½ in., 4 x 1½ in.

Linings, T. & G.—4 x ⅜ in., 6 x ⅜ in., 4 x ½ in.

Boards. -(Sizes 6 ins. wide and over by 3 ins., stocked in super quality only).
Up to 3 x 1 to 2 in
Up to 6½ x 1 to 2 in
Up to 9 x 1 to 2 in
Up to 11 x 1 to 2 in
12 x 1 and up to 6½ in.
14 x 1 and up to 6½ in
16 x 1 and up to 6½ in.
18 x 1 and up to 6½ in
20 x 1 and up to 6½ in.
22 x 1 and up to 6½ in.
24 x 1 and up to 6½ in.
26 x 1 and up to 6½ in
28 x 1 and up to 6½ in.
30 x 1 and up to 6½ in
32 x 1 and up to 6½ in
34 x 1 and up to 6½ in
36 x 1 and up to 6½ in

Turnery Squares Up to 2 x 2 3 x 3 4 x 4 4½ x 4½ in

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19e

PARQUETRY FLOORING CO.

650 NICHOLSON ST., NORTH FITZROY, VICTORIA

TELEPHONE J.W 1141 (3 lines)

19e

Advantages

Parquetry flooring is advantageous in that it is fireproof, being absolutely airtight, silent to the tread; it saves floor height by dispensing with beams and joists, it gives appearance, extreme durability, warmth and hygiene. All flooring laid by us is of selected stocks, perfectly seasoned, scientifically dried, manufactured with precision and infinite care is used in laying and finishing

Sizes

Consisting of tongued and grooved blocks so designed as to interlock at both sides and ends, to ensure a perfectly level floor. Parquetry Flooring is made in a standard size of 12½ in x 2½ in. x 13 16th in. for buildings with cement floors In residences the usual block is ⅝-in. thick and is secretly nailed to existing wood floors

Service to Architects

We are at all times ready to advise on flooring problems on new or renovating work and will prepare estimates for complete installation, including preparation of sub-base, laying, finishing and polishing

Chapel Convent of Good Shepherd, Oakleigh, Victoria

Materials Used and Finish

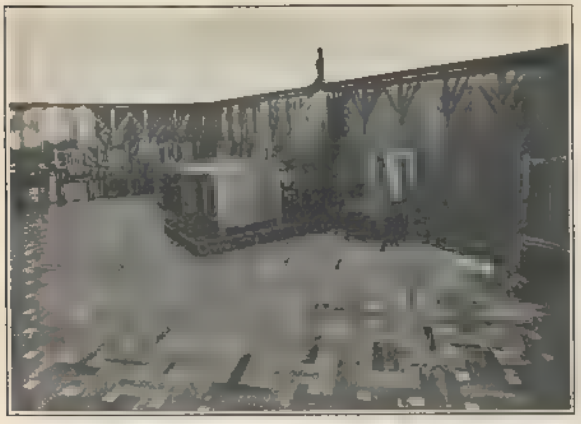
Timbers generally used are Kiln-dried Victorian Ash or Tasmanian Hardwood Jarrah, Blackwood and Imported Oak Other timbers can also be supplied This type of floor may be laid in a great variety of designs, and has an exquisite finish, as after laying the surface is electrically sanded filled and wax polished

Preparation of Sub-Base

In concrete buildings, the blocks are set with a special bituminous cement (heated to a correct temperature) direct on to the screeded surface. In other buildings, the under floor is properly dried, then a specially prepared binder coat is first applied, on which the blocks are set in the heated mastic

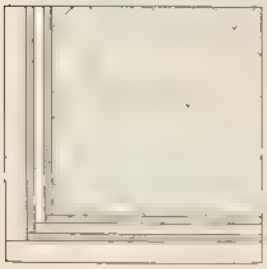
Selection of Designs

We realise the difficulty of selecting suitable designs from illustrations, diagrams or small panels of parquetry flooring and so have so arranged that they can show to architects and their clients a large range of actual samples in position and under traffic

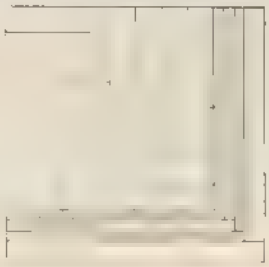


Chapter House, St. Paul's Cathedral, Melbourne

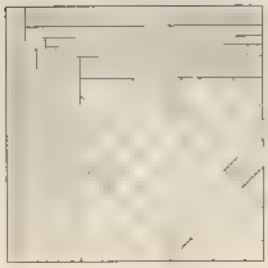
Lounge, Private House



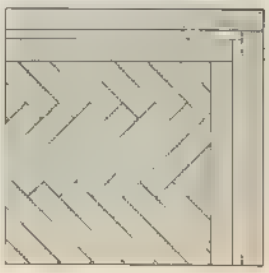
Design 1



Design 2



Design 3



Design 4

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19e

BROOKS, ROBINSON PTY. LTD.

ELIZABETH STREET, MELBOURNE

WORKS: MAFFRA STREET, SOUTH MELBOURNE

Telephone M 3131 (5 lines)

B—R

ARCHITECTURAL WOODWORK

Brooks, Robinson Pty. Ltd. specialise in the best class of interior woodwork, comprising high-class joinery and panelling

Stocks of fully seasoned Australian timbers enable them to fulfil all contracts successfully and promptly

Importance of Correct Seasoning

Probably there are no more beautiful timbers in the world than the Australian hardwoods and figured timbers, but unless they are thoroughly and scientifically seasoned they may show distinct signs of warping when framed

When considering Mountain Ash (the hardwood so widely available in Melbourne) for joinery and panelling, the architect should specify first quality timber free from gum veins shakes and other defects, and to be kiln dried and reconditioned—the latter process ensuring the correct scientifically determined moisture content

No Australian timbers should be used without being seasoned, either by air or kiln, and sometimes by both. Different Australian timbers require different methods and times for seasoning, but timber should be in every case cut in the winter when the sap is more dormant than at any other time during the year

None but matured trees should be used, as immature saplings are often a great cause of trouble in joinery work.

The timbers used by Brooks, Robinson Pty. Ltd. are carefully selected for maturity. Careful cutting, stacking and seasoning, and fine stocks of first class joinery timber are held by us.

Modern Panelling

In modern and ultra-modern panelling designs the absence of mouldings is compensated for by the use of grained and figured veneers, with the direction of graining and special inlays.

Designs that have been executed by Brooks Robinson range from the modern adaptation of the Jacobean and Elizabethan with their enriched mouldings and carving to the modern and ultra-modern with absolutely flush surfaces.

The above illustration shows an example of modern panelling carried out by Brooks, Robinson Pty. Ltd. The timber is Queensland Maple veneer in flush panels, with contrasting graining and inlays.

These panels of flush work may be obtained in widths from 4 ft. up to 8 ft. without joints, as they are made up of plywood and covered with thin veneers Because of this construction the chance of warping and shrinking is negligible

The finishes of the panelling depending on the decorative scheme are practically unlimited, ranging from dull to the modern highly polished glass surface

Board Room, Harbour Trust Building, Melbourne.
Architects: Messrs Smith Ogg & Serpell.

A Recent Contract

Brooks, Robinson Pty. Ltd. have been responsible for many of the finest interior panelling contracts fixed in Melbourne in the last few years The illustration of the panelling in the **Board Room of the Harbour Trust Building** shows one of their recent contracts, which was carried out under the direction of the architects, Messrs Smith, Ogg & Serpell The panelling of Australian blackwood is probably one of the finest examples of panelling in this timber that has been fixed of late years. The timber was air dried for a number of years, after which it was specially selected for good grain, sound quality and beauty of figure and then scientifically reconditioned Although the panels are solid, and not veneers, no signs of contraction are visible This is entirely due to the careful seasoning of the timber and accurate joinery—typical of all joinery work undertaken by Brooks, Robinson Pty. Ltd

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

STORE FRONTS

"CUPROS" GLAZING

T. S. GILL & SON PTY. LTD.

672-684 CHAPEL STREET, SOUTH YARRA

MELBOURNE

ESTABLISHED 1892 — GILL — PHONE: WINDSOR 8000

26b

S.A.A. File No.

[For Other Products, See Index]

Products

Interior Fittings for Stores, Banks, Offices, Hotels, Churches, Private Houses, and any kind of high-class Joinery Work.

The Elements of Good Joinery Work

T. S. Gill & Son Pty. Ltd., having had long experience in the wide field of high-class joinery work for all types of buildings, offer the following remarks concerning the important elements necessary in the seasoning, panelling and polishing of Australian timbers. The best of the methods described are typical of their work, and can be accepted by the Architect as a basis of good workmanship in the production of the above products.

Materials

The quality of the timber to be used is one of the main essentials to high-class joinery. The quality of various Australian timbers is most excellent, the drying or seasoning being of the greatest importance, and it is a wise precaution to see the actual timber proposed to be used before placing an order for first-class joinery. Many methods of drying timber artificially have been introduced, but the safest method up to date is to stack timber in the open air, with 1 in. battens, say, every 4 ft. apart, and the edges of the planks spaced 2 in. apart. Timber stacked in this way for a period of not less than two years may then be stacked under cover and is safe for use as required.

Construction

All panelling should be framed, i.e., mortised and tenoned. All stiles and rails should be grooved to receive the panels, or solid rebated to receive glass. An alternative to this, and one commonly used, is to dowell the rails into the stiles, and "plant," i.e., nail on moulds or beads to receive panels or glass. This is obviously a much cheaper method than framing, but should only be permitted in work of a very cheap character.

Polishing

The grain in many of our Australian timbers is so beautiful that it is worthy of the greatest care in polishing, by which means its beauty is enhanced.

Method of French Polishing

All surfaces to be polished should be finished with a scraper and fine glass paper before being handed to the polisher. The first process should be that of "filling in" the open grain. This should be done with plaster of paris, which should be tinted to the colour of the desired finish. The plaster should be made quite wet and then applied with a rubber of hessian or any coarse material, and should be well rubbed in until all the open grain is perfectly filled up. The work should then be left until quite dry, and then washed off with raw linseed oil. All faces should be thoroughly rubbed down with very fine or worn glass paper.

The polish used should consist only of methylated spirits of wine and a first quality of shellac. This should be applied as a first or "bodying-up" coat, with a rubber made of cotton wool, contained in a clean cotton rag, the rubber being saturated with polish, having a moistening of raw linseed oil on the face of the rubber. The polish should be applied in this way until a slight polish is produced, in the meantime rubbing down with glass paper where any roughness appears. At this stage, the work should be stood aside for at least twenty-four hours, to allow the polish to sink into the wood. When commenced again, the whole surface should be thoroughly rubbed down with fine paper and raw oil and then wiped quite dry with a clean cotton rag. The finishing coat should be all as before, but gradually reducing the quantity of oil until the spirits have killed all the oil, which may be decided by rubbing the finger across the surface. Should a smear appear it is certain that a little oil still remains. When an even, bright surface is obtained, the final process is known as "spiriting off." This is done with a clean, new rubber, using spirits of wine only. This is carried in straight lines over the whole surface, resulting in a permanent highly-polished surface.

A much cheaper method, and one largely in use, is after the work has been filled in as set out above and oiled off, a coat of spirit varnish is applied with a brush, and, before the varnish is quite dry and hard, it is "stiffened out" with a polish rubber. This class of work will, in a very short time, show cracks all over the face, similar to those on the face of a glazed tile. Further, this work, unlike a genuine French polish, cannot be revived unless the original varnish is washed off with spirits of wine. This work is commonly called "french polish," but costs less than half that of a polished job.

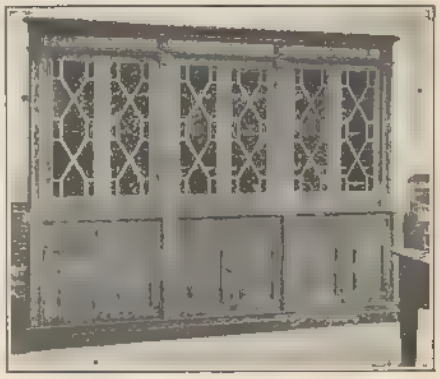
Typical Examples of Interior Fittings by T. S. Gill & Son Pty. Ltd.

(Left)—Portion of the Store of Henry Buck Pty. Ltd., Melbourne.

Architects: Sydney Smith, Ogg & Serpell

(Right) — Blackwood Bookcase.

Architects: Stephenson & Meldrum



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26a

S.A.A. File No.

GLASS AND GLAZING

(Prepared by the Architectural Staff of Ramsay's Catalogue from Authentic Sources)

26b

S.A.A. File No.

CLASSIFICATION OF GLASS AVAILABLE IN AUSTRALIA

1. SHEET GLASS.
   - Plain sheet glass.
   - Fluted glass.
   - Muffled glass.
   - Ground glass.
   - Cathedral glass.
   - Heat-resisting glass.
2. CROWN SHEET GLASS.
   (Not generally stocked, but can be imported.)
3. PATENT PLATE GLASS
   (Not generally stocked.)
4. POLISHED PLATE GLASS.
   - Polished plate.
   - Wired plate, hexagon mesh.
   - Wired plate, square mesh.
   - Wired plate, single wire.
   - Coloured plate.
   - Safety plate.
5. ROLLED GLASS.
   - Figured rolled.
   - Patent rolled plate.
   - Rough cast plate.
   - Rough cast plate, wired.
   - Patent rolled plate, wired.
   - Prismatic plate.
6. COLOURED GLASS.
   - Sheet.
   - Cathedral rolled.
   - Figured rolled

SHEET GLASS.

Plain Sheet Glass is graded into four different qualities in accordance with the freedom from imperfections found in the various sheets. Australian standard is "thirds" quality. Some of the inferior qualities reach Australia in the guise of "thirds."

"Seconds" and "first" quality are also used in better class jobs, but the architect should not expect a plate glass appearance from even "first" quality.

One-eighth plate glass can be obtained up to two super ft. at a cost of a few pence per super ft. more.

Sheet glass is obtainable in sheets with maximum limits of length, breadth and area corresponding to weights per super ft., as follows:

16oz. up to 50in. x 36in.—
- Extreme length—60in.
- Extreme width—36in.
- Extreme area—14 sq. ft., approx.

21oz.—up to 60in. x 44in.—
- Extreme length—72in.
- Extreme width—44in.
- Extreme area—21 sq. ft.

26oz.—up to 72in. x 48in.—
- Extreme length—72in.
- Extreme width—48in.
- Extreme area—24 sq. ft.

It will be noted that the extreme length and width cannot, in all cases, be combined in the same sheet.

Fluted Glass is blown to form corrugations (wide or narrow) both sides of the sheet. The fluting strengthens the sheet, and secures greater privacy with less loss of light than other forms of obscured glass. It can be obtained in 1/10th in. thicknesses and sheets not over 56 inches long or 36 inches wide.

Muffled sheet is somewhat similar.

(Courtesy of Brooks Robinson Pty. Ltd.)

An extremely effective design through the use of Figured Glass.

Sky—Flemish. Sails—Acided Flemish; Hull—Pinhead Morocco. Water—Muffled.

PLATE GLASS.

Polished Plate is the best quality plate glass obtainable, and is available in sheets up to 240 feet super., or 240 inches long, or 144 inches wide. The standard and cheapest substance is ¼-in. in thickness—this varies, as provided by the makers, from full 3/16th in. to bare 5/16th in., hence an exact ¼-in. should not be expected.

Also available in 5/16th in. and ⅜-in. thicknesses.
- 3/16th in. thick costs more than ¼ in.
- ⅛ in. thick costs more than 3/16th in.
- 1/16th in. thick costs more than ⅛ in.

The progress steps of manufacturing include casting, grinding, smoothing and polishing, resulting in two general types — ordinary plate and silvering plate for mirrors, etc. Polished plate glass is indispensable for shop windows, and is being extensively used in high-class work when a complete absence of distorted vision is desired. It can be bevelled, and finished with embossed, brilliant cut and sand etched designs.

Figured Rolled Glass is made in a variety of patterns, from those of a simple finish to elaborate floral designs, all of which are produced from engravings on the rollers, and are known by such names as "Arctic," "Gastre," "Morocco," "Flemish," pattern G, etc. This type of glass is made either white or tinted, and is principally used where a semi-transparency of vision is wanted.

Patent or Rough Rolled Plate is finished with one side smooth and the other formed with narrow parallel lines or flutes.

It is manufactured from ⅛ in. to ½ in. thick, and in stock sizes not exceeding 120 inches in length or 40 inches in breadth.

Rolled plate is extensively used for all classes of warehouse and industrial buildings where vision but not light is to be intercepted. It may be obtained with embedded wire netting, which makes it an efficient glazing for skylights, etc. It also complies with the Fire Underwriters' requirements.

Rough Cast Plate is the cheapest quality of plate glass, and is supplied in 3/16th in. and ¼ in. thicknesses, and in sheets up to 120 in. x 40 in. This glass is principally used in warehouse, workshop and factory window and skylight glazing when light but not clarity of vision is wanted.

PUTTY.—Putty for wood glazing is made from raw linseed oil and powdered whiting—it should be free from gritty particles or stickiness.

Ordinary glazing putty is not suitable for glazing metal frames, as the frame will not absorb the excess quantity of oil. A minimum amount of linseed oil should be used with the whiting, and red lead or litharge added in sufficient quantity to assist quick setting. Mastic cement, especially prepared for glazing metal frames is available.

SPECIFICATION FOR GLAZING

(For Use Primarily in the Residential Job)

MATERIALS.

SHEET GLASS shall be plain sheet, 21 oz. (26 oz.) Australian standard.

PLATE GLASS shall be ¼ in. (⅜ in. or.. ..) thick polished plate glass. Where bevelling is called for, it shall be 1 in. (1½ in.) wide and on one side only.

(Describe any special finishes in a later schedule.)

OBSCURED OR OTHER GLASS

(Describe type of glass to be used and refer to later schedule for location.)

PUTTY.—Linseed oil putty shall be used in wood frames, and metallic or mastic putty in metal frames.

WORKMANSHIP

GLAZING—WOOD FRAMES.—All glass shall be well bedded and back-puttied, and shall be sprigged where necessary.

Where wood beads are needed to secure the glass, it shall be back-puttied.

GLAZING—METAL FRAMES.—All glass shall be well bedded and back-puttied. Set all glass in .... mastic putty.

COMPLETION.—Carefully trim and clean off all putty on completion.

Take out and renew all cracked, damaged, scratched or defective glazing, and leave all glazing sound and perfect at completion.

(A schedule of all glazed areas with types and finishes of glass should follow.)

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

SECTION J

[Containing S.A.A. Filing Section No. 26]

GLAZING AND SHOPFRONTS

(See also opposite page)

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

26b S.A.A. File No.	BROOKS, ROBINSON PTY. LTD. SHOP FITTERS ELIZABETH STREET, MELBOURNE WORKS: MAFFRA STREET, SOUTH MELBOURNE *Telephone M 3131 (5 lines)*	B-R

[For Other Products, See Index]

SHOP FRONTS

Shop Front Design

The design and planning of a shop front must be considered in conjunction with the type of merchandise to be displayed together with a study of the locality of the business

The shop front should be the definite introduction between the buyer and the seller, and for this reason alone the most careful consideration should be devoted to its design and planning

Brooks, Robinson Pty. Ltd., who have specialised along these lines for many years, offer their services to Architects with regard to the design and planning of the successful shop front.

Materials

The choice of materials used in shop front manufacture is also another item for consideration The framing consisting of

1. Wood
2. Metal sheathed wood
3. Extruded metal.
4. Any one of the above in combination with castings, stampings, or enamels.

1. In a wood shop front with small mouldings the timber must be well seasoned, the joints correctly designed and carefully manufactured, and this work can only be satisfactorily made by the expert and reliable shop-fitter Wood shop front mouldings must be periodically varnished or polished to keep the timber in condition, and in no circumstance should this important work of conditioning be neglected

A typical Metal Shop Front Installation by Brooks, Robinson.

2. Metal sheathed mouldings are made in copper, bronze, brass, white metal, aluminium, and many other alloys as well as in stainless steel. These metals, except the last, need constant cleaning and polishing if they are to be kept bright, but it is far better to let the metals oxidise naturally, or to have them chemically oxidised by an expert, and then to clean them with warm water and occasionally the use of a little oil.

3 Extruded metal mouldings are coming more into use on account of the fine arrisses and clean-cut mouldings that can be made It is more expensive, but can be used with success in combination with the before-mentioned mouldings under 1 and 2.

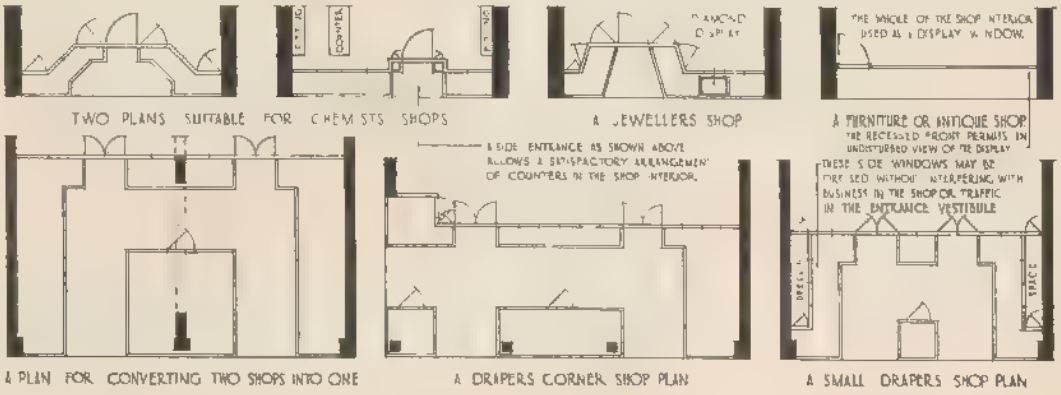
4. Castings and stampings are often used as capitals and bases for upright bars in shop fronts, as well as for design and relief in a wide transom.

Enamel may be used in combination with cast caps and bases or with cast transom ornament, giving tone and distinction to shop front design.

Brooks, Robinson Pty. Ltd. manufacture shop fronts in all these materials, having numerous sections for selection, but Architects' designs can be carried out and dies made for any special work.

Other Products

Brooks, Robinson Pty. Ltd. also manufacture counters, fixtures, showcases and all fitments required for the modern store. Their designing staff are at all times at the service of Architects both for shop fronts and the planning and layout of large stores



Plans of Seven Types of Shop Entrances.

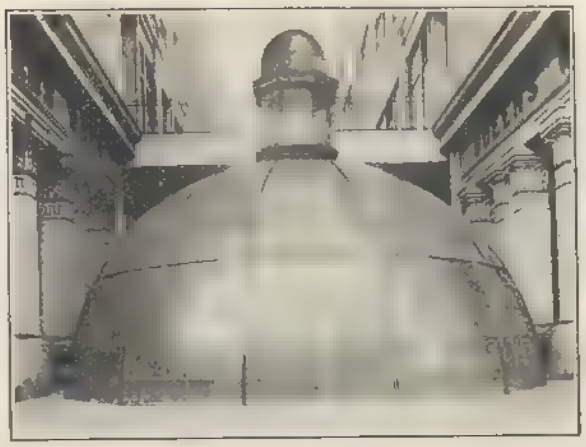
(Continued on next page

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

"LUXFER" COPPER GLAZING

What Luxfer Copper Glazing is

Luxfer Copper Glazing is a patented process in which pieces of glass are clamped up into panels of the required design, having only thin strips of copper between the pieces of glass The panel is then suspended in an electrolyte, and by the passage of an electric current, copper is deposited on the copper strips and extends over the glass, forming a glazing head in intimate contact with the glass



Dome, Queen's Walk, Melbourne.

Fire Underwriters' Approval

As a result of satisfactory fire tests made in Great Britain, America and on the Continent, panels of stained, plain or prismatic glasses glazed under "Luxfer" patents were found to be extraordinarily fire-resistant, and as such this glazing has been approved by the Fire Underwriters for fire-resisting construction

Selection of Glass and Applications

Almost any form of figured, plain, prismatic stained or plateglass or combinations to form patterns may be glazed by the "Luxfer" Copper-glazing method

As illustrated, this copper glazing may be applied to domes, ceilings and entrance doorways. Other applications include lift doors, partitions and partition doors, fanlights, windows; and, in fact, in any position requiring an ornamental and fireproof glazing

FIRE UNDERWRITERS' SPECIFICATION.

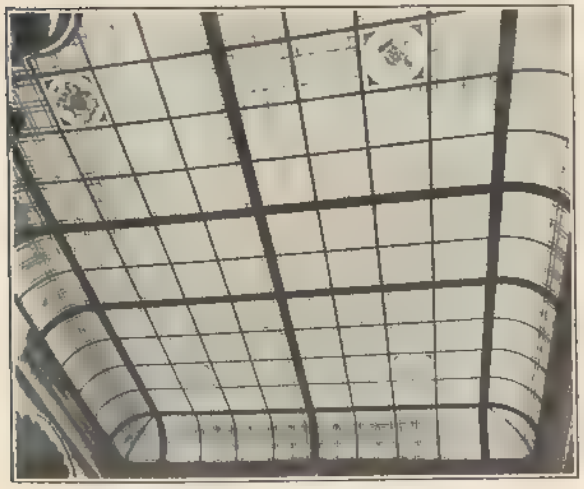
Glass used should not be less than ¼-in. thick, no piece of glass should exceed 16 sq. inches area, and no panel should exceed 4 sq. feet area —this to comply with Fire Underwriters' Association

Advantages

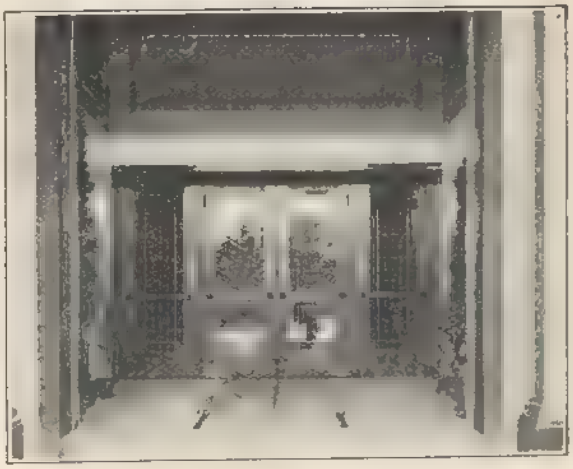
The "Luxfer" form of copper glazing produces a very neat panel, having small copper glazing bars which are very strong and heat resistant

As there are no low-melting point or combustible materials used in the construction of the panel, and because of the strength of the copper glazing, the "Luxfer" Copper-glazed Panel will resist fire without disintegrating until either the glass melts or the frame holding the panel collapses, and although the glass itself may crack, the pieces will remain rigidly in position, held by the copper glazing

Brooks, Robinson Pty. Ltd. have the sole rights to manufacture Luxfer Glazing in Australia, and it is the only glazing that has been approved and accepted all over the world. Luxfer Fire-resisting Glazing never varies in quality and is the perfect manufacture.



E.S. & A. Bank, Collins Street, Melbourne



Doors, Hotel Windsor, Melbourne.

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26b

S.A.A. File No.

T. S. GILL & SON PTY. LTD.

672-684 CHAPEL STREET, SOUTH YARRA

MELBOURNE

ESTABLISHED 1892 — GILL — PHONE: WINDSOR 8000

STORE FRONTS — "CUPROS" GLAZING

[For Other Products See Index]

Products

Store Fronts in Metal or Wood, "Cupros" Fire-Resisting Glazing, Lead and Copper Glazing

Store Fronts

Store Fronts in any class of metal or timber, either to Architects' drawings, or, when requested, we are prepared to submit designs, prepared under Architects' directions.

Co-operative Service

We carry a library of the latest European and American literature dealing with this class of work, which, if required, is at the Architects' disposal.

Store Front, Francis House, Melbourne.
By T. S. Gill & Son Pty. Ltd. Architects: Blackett & Forster

Essential Points in Store Front Construction

The brief notes on this and the following page have been prepared with the object of placing before the Architect such information which will enable him to clearly perceive the essential points necessary in good shop front construction methods. Such methods are employed by T. S. Gill & Sons Pty. Ltd., whose years of experience authorises them to present this information.

The life of a metal store front, if constructed to these particulars, is practically that of the building. Further, no maintenance cost is necessary in the shape of painting or polishing

STORE FRONT CONSTRUCTION

Metal Work

The gauge metal that should be used is 20 ozs. to the square foot. This should be drawn on to a wooden core, the core being made of either selected yellow or sugar pine, the edges of the metal being pressed into the core, as shown in Fig 1. Where the desired finish is "bright," the mouldings should be polished on a high-speed mop or buffing machine. In the case where copper or Muntz metal is used, and an oxidised finish is desired, the moulds should be cleaned with a fine emery powder and then oxidised. The sill mould should be of a suitable section to take the stiles and angle bars. There may be one or two transoms to suit any given design or varying heights. The tops of all transoms should be flashed with either a light-gauge copper or 26-gauge galvanised iron

Method of Metal Construction

All internal and external mitres in the metal work should be accurately fitted and loaded from the back and then sweated from the front, thus securing an absolute joint. All vertical bars should be tenoned into the horizontals and then loaded and sweated as before. Where the frontage is of too great a length to be glazed with one plate, the division bar should be reinforced with a wrought-iron stiffener, with cross members at the sill, transom and head. We advise no plate longer than 144 inches or higher than 96 inches.

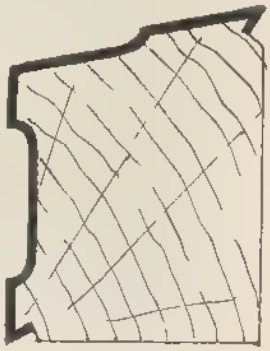

Fig. 1—Typical Section of Metal Mould.

Glazing

Between the sill and first transom, the glazing should be in ¼-inch polished plate-glass. Between first and second transom, or between transom and head, various glass treatments may be used, either leaded glass, copper glazing, embossed or blasted glass, or any of the various figured rolled glasses now obtainable

Method of Glazing

All glass should be cut about 1/16th in. less than the opening to be glazed. All rebates should receive a good bed of soft, quick-drying putty. The glass should be forced tightly against this bedding to squeeze out all surplus material. This should be cleaned off from the face and any cavities should be filled up, thus securing an absolutely watertight joint. The glass should then be secured in position with glazing beads, which should be screwed to the frame (See Fig. 2.) Where "angle" bars occur, great care should be taken to see that the glazing bead is made on the correct angle, thus forcing the glass tight into the bed and making a dovetail joint.

Fig. 2—Typical Section of Shop Front Frame.

(Continued on next page)

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

Pier Cases

Owing to the high value placed upon all main street frontages, every inch of available space is utilised for display purposes, hence the advent of the pier case.

The framework of a pier case, to comply with the building regulations, must be in metal. Its projection beyond the building line is limited to 4½ in., and no projections below 9 feet from the footpath, or more than ½ in. in front of the glass is allowed by the municipal authorities. Great accuracy is necessary in the construction of a pier case, as the front and returns open as a door. (See Fig. 3.)

The framework should be of metal to match the store front, the front and two returns being glazed with plate-glass. The back must be framed up, as on this depends the strength and strain of the door. This back may be either faced with a polished ply-wood panel or with a mirror, as desired.

The method of hanging the door of a pier case is to extend one wing of the hinges so that it extends well across the framed back already referred to. Both hanging and closing stile of the door should be grooved to fit over a tongue in the back, to keep the case dust-proof. A similar method should be adopted for both the top and bottom of the door

Locking Apparatus

A good quality Mortise Dead-lock should be sunk into the bottom of the case, the bolt to shoot into the bottom rail of the door; the closing stile of the door should be built hollow. Into this hollow a $\frac{5}{16}$-inch steel bolt is inserted, with a cone-shaped base. When the door is being closed, the cone strikes a metal ramp (see Fig. 4), which forces the bolt upwards into a holed metal plate made to receive it. By this method, the door is absolutely secure at both the top and bottom. A wrought iron arm is necessary at the bottom of the case, to prevent the door opening beyond the square and probably breaking the window. Adjustable fittings, adapted to carry either glass shelves or rods for dressing, may be used.

Fig. 4. Pier Case Bolt.

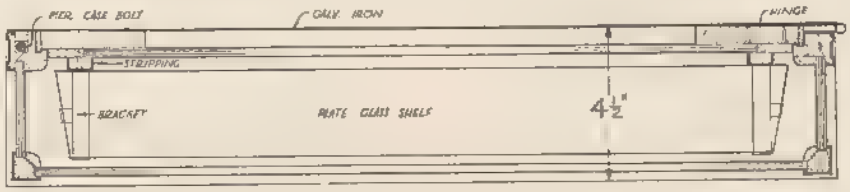

Fig. 3—Pier Case Construction.

"CUPROS" AND DOMESTIC COPPER GLAZING

"Cupros" Copper Glazing

"CUPROS," or Copper Glazing, is a comparatively new process, superseding, in the first instance, the ordinary lead-light glass

Method of Manufacture

"CUPROS" Glazing lends itself to any design that may be desired. The pattern is sketched full size as for leaded glass, but, in place of the lead strips, 26-gauge copper is used as a divide between the various glasses A "U" section is used for the outside member, and, where a large expanse of glass is required, "H" sections of various sizes are introduced. When the whole is cut and assembled, the work is transferred into a copper bath and is there treated for varying periods from six to fourteen hours, according to the nature of the work. The copper deposit collected on the various sections forms a rebate for the glass, and the panel, when finished, forms practically a solid mass. (See Fig. 5.)

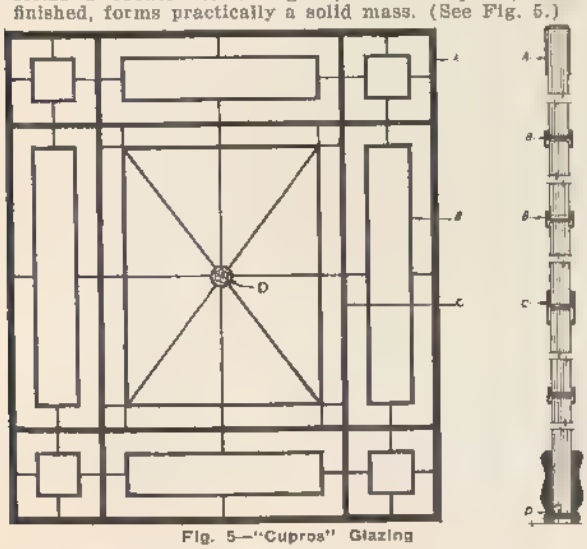

Fig. 5—"Cupros" Glazing

"Cupros" Fireproof Glass

This is in all respects similar to the above, and is accepted by the municipal authorities as "fire-resisting." In this work, no individual piece of glass must exceed an aggregate of 16 in. and no separate panel must exceed 4 ft. super face measurements. For this class of work, all glass used must be a minimum of ¼-in. thick.

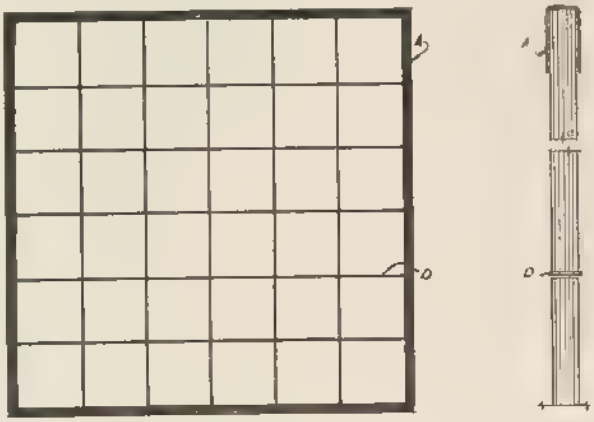

Fig 6—Fire-resisting "Cupros" Glazing

Domestic Copper Glazing

For domestic Architecture, this class of glazing is pre-eminent. It lends itself to much more artistic work, and, if in use for outer doors and side lights, is much more burglar-proof than leaded glass, the latter being readily opened by forcing the soft lead and removing any number of pieces of glass

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

26b

S.A.A. File No.

WUNDERLICH LIMITED

Manufacturers of

Wunderglaze (Electro-Copper Glazing)

Administration: BAPTIST STREET, REDFERN, SYDNEY, N.S.W

Showrooms and Offices.

SYDNEY, Baptist Street, Redfern
STH. MELBOURNE 210 Hanna Street
ADELAIDE: Grote and Morphett Streets.
PERTH: Lord and Short Streets.
BRISBANE, Amelia Street, Valley.
NEWCASTLE: Builders' Exchange, King St.
HOBART: 139 Macquarie Street.
LAUNCESTON: 71 St. John Street.

[For Other Products, See Index]

Description

Wunderglaze is the trade name for Wunderlich Electro-Copper Glazing, made by improved method, assuring an unusually heavy copper deposit and utmost rigidity in the finished panels.

It is composed of selected glasses, fabricated into various designs (usually geometrical) by copper cames (i.e., division strips), of I, H and channel sections, which are electrolytically deposited into intimate adhesion with the glass, forming a close-fitting rebate around the quarries and holding them rigidly in position, with the result that the panel thus built up is virtually one homogeneous whole.

Applications

The use of Electro-Copper Glazing (Wunderglaze) is essential, in fact, compulsory—in many cases, such as lift doors and enclosures; and its employment is eminently desirable for the glazing of door panels, translights, windows, light wells, partitions and ceiling lights in city buildings, and of door panels, windows, bookcases and cupboards in dwellings.

Strength and Durability

Being united, by electro-copper depositing, into a rigid panel, Wunderglaze is not subject to distortion. Its inherent strength renders it capable of resisting rough usage, as when employed for door panels or window sashes, unlike other types of glazing it does not require strengthening rods, with their unsightly wire ties.

Fire-Resisting Glazing

Wunderglaze for elevator doors, fireproof partitions and similar purposes, if made to the requirements of the Fire Underwriters, is accepted as an approved fire-resistant and samples made to this specification have been tested to withstand a temperature of 1750 degrees Fah., without "breaking down." The regulations insist that Wunderglaze fireproof door panels shall be limited to 4 square feet in area, with quarries not exceeding 16 square inches, but if it is required to glaze larger panels, this can be effected by subdividing the area, with Wunderlich approved section reinforcement bars.

Use of Colour

A deliberate exploitation of colour is not always essential to an attractive Wunderglaze treatment, since effects of utmost charm and refinement may be attained by the tasteful blending of the textures of the component glasses. But if the occasion calls for a scheme of colouring, the resources for this purpose are unlimited, embracing as they do the entire gamut of subtle tints so exclusive to glass, as well as the more dominant and brilliant hues. In its refined setting of thin copper cames, a scheme of colouring acquires enhanced charm when carried out in Wunderglaze.

Refinement of line is a feature of Wunderglaze, this being due to the thinness of the rigid copper cames (division bars).

Wunderglaze Designs

A review of the method of fabrication at once demonstrates that Wunderglaze offers scope for unrestricted variety in design; but as a guide to correct practice, and to provide a basis for prices, we have produced a useful range of standard designs. Blue Prints displaying these will be furnished, free of charge, on request.

The services of our Art Department, with its trained designers and technical experts, are always at the disposal of clients, to assist them in the preparation of designs, to suggest appropriate treatments, or to advise as to the proper selection of glasses.

Display of Samples

Sample Panels of Wunderglaze are display in our Showrooms in each State (see addresses above).

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

SECTION K

[Containing S.A.A. Filing Section No. 25]

PAINTS

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

25

S A A File No

THE AUSTRALIAN PAINT & COMPOSITIONS CO. LTD.

IN ASSOCIATION WITH

THE INTERNATIONAL PAINT & COMPOSITIONS CO. LTD.

FOUNDED AT NEWCASTLE-ON-TYNE ENGLAND, 1881.

'DANBOLINE'

'LAGOLINE'

AGENTS:

Northern Queensland: BURNS, PHILP & CO. LTD., Townsville and Cairns.

Southern Queensland. JAS. D. SLOAN & CO. Brisbane.

Victoria: HOBSON'S BAY DOCK & ENG. CO. PTY LTD., Melbourne.

REG° TRADE MARK "INTERNATIONAL"

AGENTS:

South Australia: P. J. A. LAWRENCE, Adelaide

Western Australia: MELBOURNE STEAMSHIP CO. LTD., Fremantle.

Southern Tasmania: CHAS. DAVIS LTD., Hobart.

Northern Tasmania: J. R. GREEN PTY. LTD., Launceston

VICTORIA: BRANCH OFFICE—403 LONSDALE STREET, MELBOURNE.

ASSOCIATE FACTORIES:

Kobe, Bergen, Bilbao, Le Havre, Copenhagen, Montreal, Genoa, New York, Gothenburg, Rio-de-Janeiro, Hamburg, Trieste, Newcastle-on-Tyne, Ripon and Glasgow

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The International Paint & Compositions Co. Ltd was established at Newcastle-on-Tyne in 1881, and since then, owing to the demand for Paints and Compositions manufactured by that company, it has been found necessary to establish factories in many parts of the world. The latest factory to be established is the one controlled by this company at Concord, Sydney, New South Wales, where all "International" speciality products are now being manufactured under the direct supervision of one of the chief technical experts of the Home company.

Whilst we manufacture every possible kind of Paint, including Ships' Compositions, we only propose to specially mention those lines which would be of interest to Architects, and for Engineers' use in protecting and decorating city buildings, private homes, factories, bridges, etc.; but before dealing with each line individually we take the opportunity of mentioning that a large staff of chemists is employed by The International Paint & Compositions Co. Ltd., London—apart from the chemists associated with each individual factory. Constant interchange of ideas between the associated companies with the English company is all the time going on, and from this it can be realised why our methods of manufacture are ahead of those of our competitors. We manufacture for sale under our Registered Trade Marks the highest quality products, which are made to a standard regardless of cost.

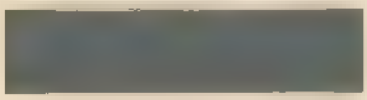
"DANBOLINE" (REGD.) PAINTS

"Danboline" Paint is known in every country of the world, and it has earned its own reputation by the results obtained under practical tests.

"Danboline" is manufactured from pure pigments, and the oil used is subjected to a special process which gives "Danboline" an elasticity that prevents cracking or falling off, likely to arise from the contraction, expansion or vibration of the metal.

The spreading capacity of "Danboline" is far in excess of ordinary paints. "Danboline" forms a smooth, uniform coating, and gives the most effective protection against rust on all iron and steel surfaces: it withstands sea air, sulphur and gas fumes, and is impervious to all external influences.

"Danboline" is made in the following shades



also Black and White, and we set out hereunder some of the uses for which it is specially recommended

Oil Tank Exteriors.
Gantrys and Runways.
Gas Holders and all Plant around Gas Works.
Galvanised Iron Buildings.
Pit-head Gear.
Bridges and Girders.
Refrigerating Plants.
Railway and Engine Shed Roofs, both inside and outside.
Tramway Bogies and Under Carriages.
Steel Railway Wagons.
Tramway Poles and Electric Standards.
Piers and Pontoons.
Railway Stations.
Sheds on Tea and Sugar Estates.

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

GOLD MEDALS

BRUSSELS EXHIBITION, 1910

"LAGOLINE"

The Enamel-like Paint

"Lagoline" is a non-poisonous paint; it withstands sea air, sea water and dampness, lasts longer and covers better than ordinary paints. It dries well, sets hard, can be repeatedly washed and contains no patent driers or other preparations of the kind apt to foster rust beneath the skin of the paint.

"Lagoline" gives the most efficient protection for Wood, Iron, Steel, Brick and Cement Work. It is equally suitable for indoor or outdoor use.

One coat over old work gives a splendid finish

"LAGOLINE" requires no preparation, and, through a special process invented by the manufacturers, remains unaffected by the oxygen in the air, the previous process of oxidization being perfect and final.

GOLD MEDALS

FRANCO-BRITISH EXHIBITION, 1908

1A

2A

8

7

9

10

11A

12

14

16

20

30

34

40

42

44

47

51

53

58

62

Also Black and White.

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

REG^D TRADE MARK "INTERNATIONAL"

OTHER

INTERNATIONAL SPECIALTY PRODUCTS

REG^D TRADE MARK "INTERNATIONAL"

"International" Compositions

The strongest and best Anti-fouling Composition manufactured. It contains all the ingredients necessary to ensure good results. During the period of 12 months over 20,000,000 tons of Shipping used "International."

"Tanctectol W"

This Composition was introduced to meet the requirements of Ship owners and Oil Companies for a Composition that will withstand Benzol, Petrol, Crude Oil, Fuel Oil, Whale Oil, Oelic Acid, Creosote Oil and similar substances

"Fairplay," in issue dated March 27, 1930, wrote as follows

"No object is, at the present time, causing greater concern to those responsible for the upkeep of Ships than the alarming rate at which corrosion is going on in vessels engaged in the carriage of oil in bulk."

"Tanctecol W." has definitely arrested corrosion, and it is not only inert towards Benzol, Crude Oils, etc., but is resistant to fresh or salt water, and there is, therefore, no fear of it being destroyed when Oil Tankers are ballasted with fresh or salt water—it will withstand steaming out.

"Pescarine"

"Pescarine" is an odourless, non-poisonous, enamel-like White Paint. This line is manufactured for the painting of Food Cupboards, Ice Chests, Cold Storage Houses, etc. Whilst it is only marketed in White, it can be had in Cream or Light Grey should a minimum quantity of 20 gallons be required.

Acid-Resisting Paint

This is a specialty line, and we recommend Architects to write us of the troubles to be overcome, as we can manufacture a line to suit the circumstances

Petrol-Resisting Enamels

These Enamels are the best it is possible to manufacture They have been adopted by the principal Oil Companies for their Transport Fleets, Petrol Pumps, etc, in all parts of the world, and as their adoption was the result of elimination tests users are assured of their high quality

"International" 4-Hour Enamels

These Enamels have been manufactured to meet the demand for a high quality, durable Enamel, that will dry fairly quickly They are of the highest quality possible, and there is a carefully-selected range of colours to choose from

Heat-Resisting Enamel

These Enamels are specially manufactured for the painting of Engines, etc.

Anti-Cement Oil Paint

This Paint can be used upon concrete, cement, fibrocement, stucco, plaster, stone, etc., for both interiors and exteriors. Dries as hard as stone and is perfect protection against dampness.

"International" Varnishes

We manufacture a large variety of Varnishes, and, apart from those listed in our catalogue we manufacture special Petrol and Benzol Resisting Varnishes, as well as all kinds of Varnishes for Industrial purposes

"Galvex"

The best anti-galvanic, anti-corrosive Composition manufactured, for sterns of Ships fitted with Bronze Propellers

It is impossible for us in this space to give detailed information respecting the full uses for all our products or the manner in which they should be applied and apart from such lines as "Danboline," "Lagoline" and "Pescarine," we should be glad if Architects desiring to specify any of our products would communicate with us when we would be only too pleased to forward full information.

A staff of over 40 chemists is continually employed in the English company's works—many of them on research work—and it can therefore be seen that not only can all problems be overcome but that the research work naturally keeps the companies associated with the English company well ahead of their competitors in research and developmental work.

YACHT COMPOSITIONS AND PAINTS

"International" Yacht Racing Anti-fouling

This Composition is used on Yachts of all Nations and is recognised as the best anti-fouling manufactured. It not only affords maximum protection against marine growths, but dries with a beautiful, smooth, glossy surface, ensuring the minimum amount of friction which is so essential to speed.

"Union Jack" Copper Paint

Is a strong anti-fouling Composition for the painting of bottoms of wooden vessels. It dries with a fine, glossy surface and protects against the boring worm.

Note—We manufacture Compositions, Paints, Enamels and Varnishes for all kinds of Ships, Yachts and Water Craft, and shall be glad to submit full particulars to those interested

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

MR. BERGER
Registered Trade Mark

LEWIS BERGER & SONS (AUST.) LIMITED

MAKERS OF PAINTS, ENAMELS, STAINS, VARNISHES, WHITE LEAD, OPEX LACQUERS, FINE DRY COLOURS

HEAD OFFICE AND WORKS: RHODES, N.S.W.

Postal Address: Box 23, Burwood, N.S.W.

Telephones: UM 6651 (10 Lines) UM 6493

25

S.A.A. File No

FOUNDED IN LONDON IN 1760—

172 YEARS OF MANUFACTURING EXPERIENCE!

1760-1814

Mr Berger, a young colour chemist, established his business as a dry colour manufacturer at Homerton, some three to four miles from the city of London. He died in 1814 at the age of 73.

1814-1860

The two sons of Mr. Berger (John and Samuel) took up the management of the business and so successfully extended their trade that in 1855 1860 the business had acquired a goodwill second to none in the British Isles.

1860-1879

The second century. Lewis Curwood Berger and his brother, Capel Berger, took charge and advanced into the paint-making world; so much so that in 1879 this activity considerably strengthened the House.

1879-1894

During this period the business was converted into a Limited Company. Mr. Arthur Berger took control and export trade was rapidly developed. Branches were established at Paris, St Petersburg, Vienna, Bombay, South Africa and in Canada. Mr. Berger withdrew in 1894 after the business had remained in one family throughout four generations

1894-1911

A small trading depot was established in Sydney, N.S.W., to take care of growing interests in the Southern Pacific

1911-1932

Hard work and organisation speedily brought their reward. In 1916 a complete factory was established at Rhodes (about 10 miles by rail from Sydney) to manufacture White Lead, Paints, Varnishes and Enamels, and later a special Lacquer unit was added The site presents the most favourable facilities for the arrival of raw materials and the despatch of finished products, possessing, as it does, a fine water frontage, rail siding, and having a direct run on the main road to Sydney. Notwithstanding the terrific onslaught of overseas manufacturers during the years following the 1918 Armistice, the Company has successfully held its ground, and to-day ranks amongst the most successful industrial enterprises of the Southern Hemisphere.

QUALITY

So huge and far-reaching are the ramifications of the House of Berger that it has the whole world to choose from for its raw materials and to this is largely attributed the high quality of each product made. Formulae conform to the best that expert knowledge can provide and so careful is the management to protect the reputation for quality which has existed for 170 years that no goods are allowed to leave the factory unless fully approved

BERGER'S GENUINE AUSTRALIAN STACK-MADE WHITE LEAD

Berger's WHITE LEAD is produced from Australian pig lead (special corroding quality), which is supplied by the famous Broken Hill mines, and although the conversion of the Blue Lead is attainable by several means, the well-known stack process was adopted. This is based upon methods which have been employed for centuries, the difference being in the installation of mechanical transporters and carriers throughout the Works which compel greater efficiency and lessen the risk of error. The process occupies from 120 to 160 days, and so complete are the milling and grinding that the White Lead Carbonate finally passes through a silk screen of 150 mesh. It is this grinding which gives to the Lead a maximum absorption of Oil, ease of manipulation, application and a complete durability, which have combined to place Berger's White Lead in the position of supremacy on the Australian market

"B.P." BERGER'S PAINT (PREPARED)

The House of Berger having, during importing days, established its goodwill in Australia with this high-grade product, the most scrupulous care is given to its manufacture at Rhodes. "B.P." is made to exact formulae, from guaranteed pure Pigments, genuine White Lead and pure Zinc Oxide, with the necessary colours for tinting, all of which are ground and mixed with pure Linseed Oil and pure Turpentine. So great is the confidence of the Company in this product that a certificate, in the form of a Declaration, is issued to all Dealers handling the line, setting forth its analytical purity, and it is safe to add that the monogram, "B.P." in the Red Seal, is by this time a recognised mark of supremacy in the paint trade of Australasia. In addition, there issue from the plant, every day, thousands of gallons of every class of Industrial Paints, Structural Paints, and amongst the latter may be classed the very exacting product demanded for use upon the famous Sydney Harbour Bridge

BERGER'S VARNISHES

The VARNISH section, a factory complete in itself, occupies an important position on the Works area, and in the intricacies of this trade—from the selection of the finest Gums to the exactitudes of boiling, refining and then ageing -the closest scrutiny is exercised.

OPEX LACQUERS

The introduction of Nitro-Cellulose Lacquers, first to the motor industry and then to other avenues of trade, provided more of a revolutionary movement than any previous development of the Paint and Varnish world. The Company was quick to send its experts to England and to America to gain first-hand knowledge of this movement and to secure such help from abroad as would enable them to grapple with the changing situation. Now there is established at Rhodes a complete unit for the production of Opex Lacquers, the adoption of which, throughout the industrial field, is a pronounced feature in the history of the House.

(Continued on next page)

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ARCHITECTS' GUIDE

FOR PAINTING, VARNISHING, STAINING AND ENAMELLING

IMPORTANT Each of the Products mentioned below bears the Berger Name and Trade Mark

SURFACE	TO PAINT Use Product Named Below	TO ENAMEL Use Product Named Below	TO STAIN Use Product Named Below	TO VARNISH Use Product Named Below
BRICK WALLS (Exterior)	Prime with "Dusseal" Finish with "B.P." or Cement and Waterproof Paint			Weathertite (Clear, waterproofing) Cannot be painted over
CONCRETE WALLS (Exterior)	Prime with "Dusseal" Finish with Cement and Waterproof Paint			
CEMENT FLOORS	Prime with "Dusseal" Finish with Floor and Paving Paint		Lime-Proof Colours mixed with Cement	
EXTERIOR WOOD SURFACES	"B.P." Berger's Paint (Prepared)	Enamelac (White) or Palladium or Synthelac	Flat Oil Stain and Varnish or Arboreum Wood Preservative—Brown	M.P. Copal or Fine Outside Oak
EXTERIOR METAL SURFACES	"B.P.," Silvergio, Anti Corrosive Paint or Ebonite	Palladium or Synthelac		M.P. Copal, Fine Outside Oak or Waggon
FACTORY WALLS (Interior)	"B.P.," Matone, "F.O.B." Cold Water Paint or Factory White	Varnol or Palladium		Fine Inside Oak or Nevamar
FLOORS (Interior Wood)	Floor and Paving Paint		Flat Oil Stain or "Quick" Gloss Stain	Varnish Stain or Special Floor Varnish
GALVANISED IRON SURFACES	Prime with Galvanised Iron Primer Finish with Structural and Roof Paint			
INTERIOR WALLS AND CEILINGS	Matone or "F.O.B." Cold Water Paint	Enamelac (White) Palladium or Opex Lacquers		
INTERIOR WOOD TRIM	"B.P." Berger's Paint (Prepared)	Enamelac (White) Palladium, Opex Lacquers or Synthelac	Flat Oil Stain or "Quick" Gloss Stain	Fine Inside Oak or Nevamar
PORCH FLOORS	Floor and Paving Paint		Flat Oil Stain	Special Floor Varnish
RADIATORS AND PIPES	Silvergio	Heat-resisting Enamels or Opex Lacquers		Heat-Resisting Varnishes
ROOFS (Metal)	Structural and Roof Paint, Anti-Corrosive Paint or Silvergio			
ROOFS (Wood Shingle)	"B.P."		Arboreum Wood Preservative-Brown	
STACKS AND HOT SURFACES	Silvergio or Smoke Stack Black			
STRUCTURAL STEEL	Prime with Ledquid (Liquid Red Lead) Finish with Structural and Roof Paint or Anti-Corrosive Paint			
TO DAMP-PROOF FOUNDATIONS	Asphaltum Black or Ebonite			
TO DAMP-PROOF WALLS	Damp Resister			
WOOD PRESERVATIVE			Arboreum Wood Preservative-Brown	Weatherboard Oil

(Continued on next page)

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FOREWORD TO SPECIFICATIONS

The specifications contained in the following pages should cover the application of paints, enamels, varnishes, stains, and so forth, on every surface. In the event of a finish of special nature being required, however, the Berger Department of Architectural Service is at the disposal of the Profession, and no obligation is imposed for reference to it.

The Department is composed of experts who have spent years in research work and actual painting experience, so that advice rendered may be thoroughly relied upon to be correct and dependable.

In almost every case the subject matter on the following pages has been divided into two parts one the "Discussion," which describes the finish to be used, and the other the "Specification," relating to application.

SYDNEY HARBOUR BRIDGE

60,000 gallons of Berger's Paint (approximately 600 tons) were used to protect this huge structure against the elements of decay. The finishing coat was prepared to specifications supplied by Dr. J. J. C. Bradfield, M.E., M.Inst.C.E., Chief Engineer to N.S.W. Government.

PAINTING OF EXTERIOR SURFACES

DISCUSSION:

"B.P." Berger's Paint (Prepared) is a carefully manufactured ready-to-use Paint, designed for inside and outside painting of all kinds of buildings It is the best paint we can make or money can buy. It is made in 44 shades, black and white, to exact and unvarying formulae from guaranteed pure pigments Genuine White Lead (Carbonate) and Pure Oxide of Zinc—with fine Berger Colours for tinting, ground and mixed with Genuine Linseed Oil and Pure Turpentine. It is ground to extreme fineness, and thoroughly incorporated by powerful machinery. In the production of dark or pigmentary colours a small quantity of a high-grade exterior Varnish is added to preserve the gloss. The result is a clear-toned Paint that spreads farther, looks better and wears longer than any Paint which can possibly be made in a small mill or mixed by hand. It is well known that a lead and oil paint will powder and chalk, lose its lustre and wash off after exposure to the weather for a time. We have found that by adding a correct proportion of oxide of zinc to the lead this defect is remedied, because the combination gives a harder, more durable paint film. Such a paint is of better colour, since zinc is whiter than lead, will retain its lustre longer, and will cover more surface than lead and oil alone. In fact, a correct combination of lead and zinc gives the ideal paint pigment — and that is what "B.P." is. See page 4 for part colour range.

Packages.—"B.P." is supplied in tins of 1-gallon, ½-gallon, quart, pint and ½-pint respectively; also in 5-gallon iron drums. All Imperial measure

Covering Capacity.—One gallon of "B.P." properly worked out under the brush will cover 850 or more square feet (one coat) according to the condition of the surface to be painted.

Stir Well. One cannot overrate the importance of stirring the Paint before use No matter how well ground, portions of the pigments will settle in the tin, and these need to be lifted to the top and evenly mixed with the liquid. Best results are secured by pouring off a quantity of the liquid and stirring the remaining contents thoroughly, returning the liquid gradually until the whole is poured back into the original package The paint will then be of even consistency throughout "B.P" is ground to the correct consistency for all classes of work, but for Undercoats the following directions should be followed

SPECIFICATION:

New Work should be thoroughly primed with "B.P." Primer (Pink); in the absence of this, the selected colour could be used, but thinned with Genuine Raw Linseed Oil, unless the surface is hard and non-porous, in which case Turpentine only should be added.

Second Coat.—Thin with Pure Turpentine in the proportion of one pint to a gallon of "B.P." This will assist to deaden the gloss, and so give a good surface for the third or finishing coat, when "B.P." must be used as it comes from the tin. If necessary, in cold or damp weather, a small quantity of Terebine or Linseed Oil can be added, say ¼-pint and 1-pint respectively to a gallon of Paint. "B.P." is an Oil Paint, and Varnish should not be used.

Old Work. — All old paint should be thoroughly scraped or burned, according to its condition, securing in the first place a good, even surface on which to work. If the timber is very porous and spongy, add one pint of Linseed Oil to every gallon of Paint, but if the timber is hard and smooth, use a similar quantity of Turpentine.

Important.—Do not attempt to paint on damp wood or in damp weather. Timber absorbs moisture and it must get out, mostly in the form of blisters.

Note. On surfaces where the finishing colour is to be a dark brown, dark green, or dark red, for best results use a suitable ground coat such as "B P" 145 thinned with Pure Turpentine. *(Continued on next page)*

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Berger's BP Paint (PREPARED)

Each shade made to a proven formula from Genuine White Lead, Genuine Zinc Oxide, Pure Linseed Oil, Pure Turpentine and finest dry colours.

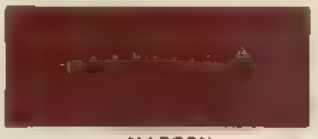
Famous for its easy working qualities and thorough amalgamation of liquid and pigment.

LIGHT STONE

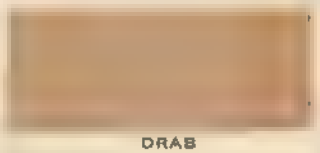
SAGE GREEN

DEEP BLUE

MID. STONE

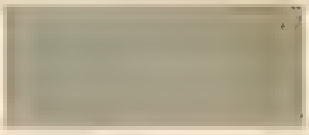

MAROON

DEEP STONE


DRAB

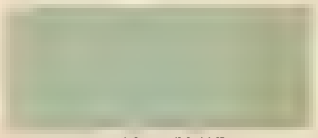
MAIL RED

DARK TAN

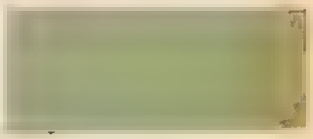

FRENCH GREY

DEEP GREEN

WARM STONE

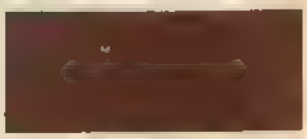

PALE BLUE

IVORY


EAU DE NIL

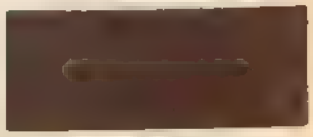
NAVY GREEN

CREAM


CHOCOLATE

LIGHT GREEN

DEEP BUFF


RICH BROWN

Also obtainable in Gloss White, Heavy Body White, Flat White, and Black (No. 153)

PLEASE DO NOT DETACH COLOUR SAMPLES. COMPLETE COLOUR CARDS (44 shades) SENT ON REQUEST

(Continued on next page)

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PAINTING OF EXTERIOR SURFACES (*Continued*)

WHITE LEAD

In all specifications of White Lead specify Berger's Genuine Australian Stack made White Lead. This is a strictly pure white lead (lead carbonate) and is ground in highly refined linseed oil. Berger's White Lead is extremely fine and very white. It has texture, body, reducing qualities, opacity, covering power and easy working qualities. Proper maturity plays a most important role in the success of this product.

CONCRETE, CEMENT AND STUCCO WALLS (TO PAINT)

DISCUSSION:

The architect appreciates the advisability of painting exterior concrete or stucco walls. This is advisable for two reasons: first, the control of the decorative effect in colour, as required by the type of building, which paint affords, and the ease in which the building can be cleaned up in appearance and the change of colour scheme effected. Second, painting a concrete wall renders it water-tight, and prevents the appearance of hair-line cracks and chipping off caused by the penetration of moisture and frost. Berger's Cement and Waterproof Paint is an oil paint designed for outside exposure, but which dries to a dull, velvety finish without gloss. It does not destroy the interesting texture of the stucco wall as does a gloss finish, but retains the effect for which stucco is specified See page 8 for colour range.

SPECIFICATION

All exterior wall surfaces should receive one coat of Berger's Dusseal (Cement Sealer) before any attempt is made to apply the paint. This will thoroughly seal the surface against moisture and the paint against the action of the alkali present. The first coat of Berger's Cement and Waterproof Paint should be thinned with pure Turpentine to a working consistency. Allow at least 48 hours to dry, after which the second coat, thinned with equal quantities of pure Turpentine and raw Linseed Oil, if necessary, should be applied.

CEMENT PATHS AND FLOORS (TO PAINT)

DISCUSSION:

Cement or concrete garden paths, garage and engine-room floors, floors in public institutions, manufacturing plants, railway cars, and on steamship decks, and other similar surfaces that are required to be painted, should be finished with Berger's Floor and Paving Paint. This highly satisfactory paint is made (in nine shades, black and ivory) of highest grade pigments combined with hard-wearing elastic floor varnish. It covers well and flows out with a tile-like surface, has a good gloss, and does not chip or mar. It is washable with hot or cold water, is sanitary, not affected by dampness, and keeps down the dust. Berger's Floor and Paving Paint is not affected by oils, grease, benzine, kerosene, or solvents, so that it may also be recommended for power-houses.

SPECIFICATION:

The surface to be painted should be thoroughly dry and free from dust, dirt and grease. For the very best results the cement should be allowed to "weather," thus enabling the first coat of Berger's Floor and Paving Paint to penetrate the cement. No reduction in the paint is necessary, and a second coat should be applied after the first has been allowed to dry out. If it is required to paint new cement, however, first apply a coat of Berger's Dusseal (Cement Sealer). This will form a foundation which acts as an effective preservative against the ever-present alkali in cement. When thoroughly dry, apply two coats of Floor and Paving Paint direct from the can.

IRONWORK AND METAL SURFACES (TO PAINT)

DISCUSSION:

Proper protection of metal from rust is only secured by care in preparing the surface for the paint, because no paint, however good it may be, can overcome the difficulties imposed upon it by a bad surface. The first essential is to thoroughly clean the surface and free it from all mill scale, rust, dirt and grease. This may be accomplished by use of wire brushes, by sand-blasting or by other similar methods. The oxide in corroded parts should be converted by being subjected to the flame of a torch, and after cleaning in this manner, the work should be immediately given a priming coat of Berger's Ledquid. The contractor should inspect the surface to be painted before the priming coat is applied to make sure that all rust, mill-scale, grease and foreign matter have been completely removed. Paint should not be applied on any wet or damp surface.

SPECIFICATION:

First Coat — Berger's Ledquid (Liquid Red Lead). All riveted and bolted connections and parts inaccessible after construction to have two coats. Second coat — Berger's Structural and Roof Paint or Berger's Heavy-Bodied Anti-Corrosive Paint (Red or Grey).

PAINTING GALVANISED SURFACES

It is often the case that the surface of galvanised iron retains traces of waste acid as a result of the galvanising process. These acids invariably attack the paint film and consequently new iron should never be painted without having a first coat of Berger's Galvanised Iron Primer.

NOTE. Berger recommendations for metal protection are Berger's Concentrated Anti-Corrosive and Berger's Structural and Roof Paints. These two finishes will give better protective value and more general satisfaction than anything else that can be used. It is realised, however, that opinions may differ to a certain extent and, therefore, other finishes are listed below to meet a very existent demand.

BERGER'S GALVANISED IRON PRIMER.—To neutralise the acid on galvanised iron and to form a bond between the iron and the finishing coat.

BERGER'S LEDQUID (Liquid Red Lead).—A scientific blending of special non-setting Red Lead and treated oil to give a perfect result wherever Red Lead could be used. These are thoroughly amalgamated with a combination of liquids to a unique Berger formula designed for keeping the pigment always in suspension so that every drop is usable. Ledquid covers more solidly than hand-mixed lead, and its finish is much smoother owing to its fine grinding.

Ledquid Specification.—Stir Ledquid thoroughly before use, lifting the paint from the bottom of the drum. Rolling and shaking the drum are also recommended. A good way to stir is as follows:—

Pour off half the contents of the drum.
Mix the remainder.
Pour back.
Stir the whole contents thoroughly.

When applying Ledquid on bare iron, or when it is to be followed by another coat of paint, thin with turpentine—about one pint to the gallon or, on an average, half a gallon to each 5-gallon drum. Do not add Linseed Oil to Ledquid when using it as an Undercoating or Priming Paint. Allow Ledquid at least 24 hours to dry before painting over it. If you can allow longer, it has a better chance to harden off, and results will be even better. When using two coats of Ledquid that are to be painted over, thin the first coat with half a gallon of turps to each 5-gallon drum and second coat with quarter of a gallon of turps to each 5-gallon drum. When Ledquid is the final coat of paint it should be used as it comes from the drum, after stirring.

BERGER'S CONCENTRATED ANTI-CORROSIVE PAINT.—Made from extra high-grade Oxide and pure Linseed Oil, specially treated in the Berger factory at Rhodes. The elasticity of this paint is remarkable, and it is so concentrated that it is capable of great reduction, thus making it the most economical finish to use.

BERGER'S STRUCTURAL AND ROOF PAINT.—Ready for use, works easily under the brush and has good covering capacity. Excellent for roofs, gutterings, down-pipes and general metal surfaces.

BERGER'S EBONITE (Bitumen Base).—A special composition that is proof against the variations in temperature or weak acid fumes. It is especially recommended for any under-water work.

BERGER'S SILVERGLO. Unsurpassed as a silver finish for radiators, water boilers, power-house boiler casings, structural iron work, rough timber, gas, steam and water pipes. Silverglo reflects the rays of the sun, thus making a considerable saving in evaporation when used on water tanks and reservoirs containing volatile liquids. Because of its reflective quality it reduces inside temperature by at least 12 degrees, making it ideal for use on iron roofs. It has been used on Queensland roofs with remarkable success. *(Continued on next page)*

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Berger's

"WET EDGE"

MATONE

The Flat Oil Paint for Interior Decoration!

Matone gives a beautiful, flat finish that diffuses light. It is washable with soap and water and does not collect dust. Leaves no lap marks.

CREAM

FRENCH GREY

JADE

MAIZE

PUTTY

LAVENDER

CHAMPAGNE

NILE GREEN

JONQUIL

MORNING BLUE

CERULEAN BLUE

MOROCCO

PINK

COCOANUT

SUN TAN

OYSTER GREY

TURQUOISE

MERCURY RED

BATH STONE

LIGHT BLUE

LIGHT TERRA COTTA

ALSO MADE IN WHITE

PLEASE DO NOT DETACH COLOUR SAMPLES

COMPLETE COLOUR CARDS SENT ON REQUEST.

(Continued on next page)

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

PAINTING OF INTERIOR SURFACES

INTERIOR WALLS (TO PAINT AND ENAMEL)

Berger's KALSOMINE

New Plaster.—Finish one or two coats Berger's Kalsomine mixed with cold water.

Old Plaster. Finish one or two coats Berger's Kalsomine mixed with cold water.

Previously Coated Surfaces.—Scrape off all old coating that is loose; size or wash down, finish one or two coats Berger's Kalsomine mixed with cold water.

Berger's "WET EDGE" MATONE (Washable Flat Oil Wall Paint)

For Timber Lining and Weatherboards.—First coat Add one pint of Genuine Raw Linseed Oil to one gallon of Matone Apply a good even coat and allow 24 hours to dry thoroughly Second coat: Half-pint of Genuine Linseed Oil and half-pint of Turpentine to one gallon of Matone Third coat: Reduce if necessary with a slight addition of Spirits of Turpentine. Not more than half-pint of Turpentine to one gallon of Matone

For Plaster, Cement, Concrete and Asbestos Sheets.—Where cement, concrete or asbestos sheets are new, one coat of Berger's Dusseal (Cement Sealer) should be first applied, then apply two coats as second and third outlined above.

Metal Ceilings. For the first coat add Raw Linseed Oil in the proportion of half-pint to one gallon of Matone. The second coat to be reduced, if necessary, with Pure Spirits of Turpentine only.

For Old Work and Renovations. These surfaces require careful treatment in order to neutralise the unevenness of repaired surfaces, stopping, etc. Repaired patches in cement or concrete should be first sealed with Berger's Dusseal Then follow with second and third coats outlined above. Old painted timber surfaces should be made clean and are then ready for the second and third coats set out above. If a light colour is to be put over a dark surface it may be necessary to apply a further finishing coat, making three coats of Matone in all

NOTE Matone should not be brushed out too thinly, but flowed and allowed to 'matt" up. Its working properties are similar to an ordinary gloss enamel, but it dries with a flat surface. Use a wide wall brush and flow on evenly with a sweeping stroke. See page 6 for part colour range. **See colour card for complete directions.**

IMPORTANT.—Stir thoroughly Replace the cover on tin when not in use

Berger's "F.O.B." (Flat Oil Bound) COLD WATER PAINT

New Plaster.—Apply good coat Berger's Dusseal, finish one or two coats "F.O.B." thinned with cold water

Old Plaster. Finish one or two coats "F.O.B." thinned with cold water.

Previously Coated Surfaces. Scrape off all old coating that is loose; size or wash down; finish one or two coats "F.O.B." thinned with cold water.

OIL GLOSS OR VARNISH GLOSS PAINT FINISH

New Plaster.—Apply one good coat Berger's Dusseal; then one coat of "B.P." Berger's Paint (Prepared) in the shade desired, with enough turpentine added to deaden the gloss. Finish with one coat "B.P." as it comes from the can.

Old Plaster.—Finish as for new plaster, or with three coats of "B.P." Berger's Paint (Prepared).

Previously Coated Surfaces.—Scrape off all old coating that is loose; wash down; finish as for new plaster with exception of Berger's Dusseal, or with two coats of "B.P." Berger's Paint (Prepared)

BERGER'S ENAMELAC (WHITE ONLY)

ON NEW INTERIOR WOODWORK

DISCUSSION:

It is impossible to obtain an Enamel of better quality than Berger's Enamelac or one which will give more satisfactory results wherever the most perfect white enamel finish, interior or exterior, is desired. The points of particular advantage that are claimed for Enamelac are perfect flowing qualities, great opacity or hiding power, firmness and elasticity, and the permanence of its whiteness. The most important feature in connection with enamel work is the building up of the undercoat or undercoats. Each coat of Enamelac Undercoating, except the last, should be carefully sanded to a smooth surface, preferably with No. 1/0 Wet-or-Dry Sandpaper, and great care should be taken to see that the work is not sanded too coarsely as even a very fine scratch is noticeable in subsequent enamel coats in high-class work. After undercoating, the enamel may then be flowed on as specified below.

SPECIFICATION:

Preparation.—Before proceeding with the work, make sure that the surface to be finished is perfectly dry and free from dust and dirt. First Coat: Apply one coat of Lead Primer Second and Third Coats. Berger's Undercoating White Enamel in the consistency supplied by the manufacturer When dry, sand with No. 1/0 Wet or Dry Sandpaper Finishing Coat Berger's Enamelac applied in the consistency supplied by the manufacturer

BERGER'S ENAMELS

FOR WALLS AND WOODWORK

Berger's "QUICK" FINISHES answer the insistent demand for quick-drying enamels, stains, silver and clear finishes. They dry in about four hours with a beautiful, hard-wearing gloss and may be washed repeatedly without injury The "QUICK" Enamels and also the "QUICK" Stains are intermixable to secure intermediate tints. Complete descriptive colour cards on request

Berger's PALLADIUM ENAMEL is particularly suitable for use in Butter Factories, Dairies, Breweries, Hospitals, Kitchens, Schools, and, in fact, wherever hygiene and cleanliness are essential factors. It may be applied over any wood, iron, brick or cement surfaces, and will withstand extremes of heat and cold, brine, steam and grease without discolouration.

SPECIFICATION:

Berger's Undercoating for Palladium Finishing Enamel—Palladium Undercoating is ready for the brush, but if desired thinner, add a little turpentine only **New Work.** The surface must be clean and free from grease. Apply one coat of Lead Primer followed by one coat of Palladium Undercoating Enamel Allow to dry thoroughly then apply a coat of Palladium Finishing Enamel, as received in the can. **Old Work:** One coat of Palladium Undercoating should be sufficient to form a good ground for the finishing coat of Palladium Enamel. The Undercoating normally dries in about eight hours, but for best results leave for at least twelve hours before applying finishing coat. **White Only:** For best results two coats of Undercoating are recommended

Berger's Palladium Finishing Enamel.

New Work: The surface should be clean and free from grease. Apply one coat of Lead Primer followed by one coat of Palladium Undercoating. When thoroughly dry, a full coat of Palladium Finishing Enamel should be applied. **Old Work:** Thoroughly clean the surface to be painted, rubbing down with sandpaper Dust carefully with a Painter's Duster or wipe over with a damp chamois leather. Apply a coat of Palladium Undercoating then follow with an even coat of Palladium Finishing Enamel. **White Only:** For best results, two coats of Undercoating are recommended See page 8 for part colour range.

INTERIOR WOODWORK (TO STAIN AND VARNISH)

FLAT STAINED FINISH Berger's FLAT OIL STAIN gives a perfectly flat finish. It should be applied fairly freely and wiped off across the grain. See Berger Page Eight for colour range For staining and preserving exterior wood surfaces use Berger's Arboreum Wood Stain (Brown). It does not hide the grain, dries with a dull finish, and its Creosote content makes it a preservative against white ants.

EGGSHELL VARNISH FINISH.—Apply one coat Berger's Flat Oil Stain in the shade desired Follow with one coat Berger's Hard Oak Varnish and when dry, finish with one coat Berger's Eggshell Flat Varnish.

GLOSS VARNISH FINISH. Apply one coat Berger's Flat Oil Stain in the shade desired Then two coats Berger's Hard Oak Varnish The first coat of Varnish should be very slightly reduced with Pure Turpentine

BERGER'S FLOOR VARNISH.—A special varnish for floors. So constructed as to lastingly protect the floor surface and to withstand the constant wear and tear of sliding chairs and moving feet.

BERGER'S NEVAMAR VARNISH.—Water-resisting, interior Varnish for furniture and woodwork, tables, bar-tops, bathrooms, hospital surgeries, etc. A very pale, extremely tough and hard-wearing finish Impervious to boiling water, alcohol and ether

The Berger range of Varnishes includes a varnish for every purpose They are made from the world's best gums, matured under ideal conditions and are unsurpassed for easy working and drying qualities, full body, fine lustre and splendid durability Samples will be sent on request

OPEX LACQUERS

The range of OPEX Lacquer Finishes is so wide and embraces so many different methods of treatment and application that it would be impossible even to attempt to discuss them in these pages. The Berger Technical Lacquer staff, however, is entirely at the service of the profession, and all enquiries will be given careful and immediate attention If necessary, and where possible demonstrations will be carried out and expert advice rendered on the job OPEX Industrial Lacquers are made in a variety of shades and clear finishes, each carrying its special primers and undercoats They have already been used with great success in many large buildings in the capital cities of the Commonwealth and in large country centres For postal address and telephone numbers see Berger Page One.

(Continued on next page)

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

Berger's

"Keep on Keeping on!"

"QUICK" Enamel

IVORY

ORANGE

"QUICK" SILVER

"QUICK" Enamel (Continued)

LIGHT BLUE

ETTUCE

PEARL GREY

"QUICK" Stain (Gloss)

WALNUT

ROSEWOOD

JACOBEAN

Palladium Enamel

LIGHT SLATE

WARM STONE

CHROMIUM GREEN

ALSO MADE IN BLACK, WHITE, AND SPECIAL UNDERCOATINGS

Cement and Waterproof Paint

LIGHT STONE

SLATE

IVORY

ALSO MADE IN WHITE

Flat Oil Stain

MISSION

MOSS GREEN

DARK OAK

ALSO MADE IN JACOBEAN, EBONY, OAK, MAHOGANY, WALNUT, ROSEWOOD AND MAPLE

PLEASE DO NOT DETACH COLOUR SAMPLES

COMPLETE COLOUR CARDS SENT ON REQUEST

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

B·A·L·M

DUCO Regd

DULUX

BRITISH AUSTRALIAN LEAD MANUFACTURERS PTY. LTD.

MANUFACTURERS OF GENUINE STACK MADE WHITE LEAD, HIGH GRADE PREPARED PAINTS, ENAMELS, COLOURS IN OIL, KALSOMINE, "DUCO" LACQUERS, "DULUX" FINISHES, ALSO SUPERFINE CHEMICAL COLOURS

Head Office, Collins Court, 374 Little Collins Melbourne, C.1
Works, Cabarita Road, Concord, N.S.W. Telephone UJ5341 (3 lines)
P.O. Box 21, CENTRAL CONCORD

Sydney Office, 32 Market Street Telephone: MA4532
Telegraphic and Cable Address: "PIGMENTS," Melbourne "PIGMENTS," Sydney

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"B.A.L.M." Products by reason of their general excellence and rigid standardisation specially merit the consideration of Architects, and where used by intelligent Tradesmen and according to Specification, protective and decorative effects of the first [illegible] assured [illegible] ng matter is [illegible] h a view to [illegible] ifications necessary for [illegible] of "B.A.L.M." Paints [illegible] and exterior surfaces.

[illegible] nufacturing a complete range of Paints and Varnishes, and having full knowledge of the most suitable materials required for the proper protection and decoration of all classes of surfaces, we are placed in an unusually advantageous position for correctly [illegible]

[illegible] ials required [illegible] on request will [illegible] tions of the effects produced by the application of "B.A.L.M." Paints and Varnishes.

Aerial view of the Works of
BRITISH AUSTRALIAN LEAD MANUFACTURERS PTY. LTD.
CABARITA, SYDNEY

B.A.L.M. Warranted Genuine Stack-made White Lead in Oil

The White Lead factory is probably the most up to date plant in the world operating on the old English, or Dutch, stack system of corrosion. This system was adopted because, although of great antiquity in its basic principles, it produces a quality of White Lead for painting purposes which has never been equalled by any of the modern or so-called quick process methods. In designing the plant at Cabarita full advantage was taken of the advice and assistance of the old established and experienced leading corroding firms of Great Britain, most of whom are financially interested in British Australian Lead Manufacturers Pty Ltd. Based upon this advice the whole of the machinery required was constructed on most modern lines by Australian engineers, and local Australian labour has been employed from the beginning of manufacturing operations.

This unique combination of British experience and Australian enterprise and initiative has resulted in producing a uniform quality of White Lead which is admitted by the British corroders to be equal to any lead produced by the Stack process. The absolute purity of the product, its texture, fine state of division, and chemical analysis guarantee to the user a White Lead which cannot be surpassed for any purpose for which White Lead is used.

(Continued on next page)

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

"B.A.L.M." PAINTS

[See page 241 for Colour Range]

"B.A.L.M." Colours in Oil

"B.A.L.M." Colours in Oil are made from the highest quality chemical and natural earth colours, ground in genuine Linseed Oil, and are unsurpassed for their staining strength

"B.A.L.M." Pure Prepared Paint

"B.A.L.M." Pure Prepared Paint is guaranteed to be a highest quality Ready Mixed Paint suitable for application on interior and exterior surfaces where maximum protection and durability combined with the proper decorative effects, are desired

"B.A.L.M." Pure Prepared Paint is the result of many years research and experiment in the development of a perfect Paint film, and has a pigment basis of 60 per cent. Genuine Stack Made White Lead and 40 per cent. Zinc Oxide, and only the strongest colours necessary to produce the standard shades, these pigments being thoroughly dispersed in a liquid medium consisting of Genuine Treated Linseed Oils, Liquid Driers and Turpentine.

"B.A.L.M." [illegible] Prepared Paint possesses many advantages ov[illegible]ngle pigmented paints. It has a longer life, better [illegible] and [illegible] readily chalk or crack, the i[illegible] actually [illegible] which is ideal fo[illegible] whereas Paint made from single pigments produce films which in disintegration form large cracks, necessitating removal of the old paintwork before repainting can be done.

Spreading Capacity Approx. 850 Sq. Ft. per Gallon

"B.A.L.M." Undercoats

"B.A.L.M." Undercoats are made in five shades, and White, and are specially recommended as Undercoats for "B.A.L.M." Pure Prepared Paint. These have a pigment basis of 70 per cent. Genuine Dry White Lead, are ground and mixed in Refined Linseed Oils, Turpentine and Liquid Driers, and weigh approximately 27 lbs. per gallon. To reduce to the correct brushing consistency "B.A.L.M." Undercoats should be thinned 25 per cent. by volume with Linseed Oil and/or Turpentine, according to the nature of the surface over which they are to be applied. "B.A.L.M." Undercoats thinned as above have excellent opacity, are exceptionally easy working, and will appeal to tradesmen, as they have in these a line which [illegible] requirements of satisfactory Undercoats for [illegible] Pure Prepared Paint, and at a cost much l[illegible] than that of the Finishing Paint

One Gallon of Undercoat thinned to the Correct Brushing Consistency will cover approximately 1,100 Square Feet.

Painting of Exterior Surfaces

NEW WOODWORK.

PREPARATION.

The surface to be painted must be dry and free from dust and dirt. Coat all knots, pitchy or sappy streaks with one coat of Patent Knotting

FIRST COAT (Priming). The Priming Coat is the most important of all, and to secure the best results "B.A.L.M." Pure Prepared Paint should be thinned with 1-pint to 1-gallon of Raw Linseed Oil, and/or Turpentine to the gallon of Paint, according to the nature of the surface to be painted. Porous timber will require the addition of Linseed Oil, whilst for hard non-porous timber a mixture of Turpentine and Linseed Oil should be used. Be careful not to put the Priming Coat on too thickly. Work Paint well into all holes and joints Where "B.A.L.M." Undercoat is used for the Priming Coat, this may be thinned with 1-gallon Raw Linseed Oil and/or Turpentine to 3-gallon Undercoat.

SECOND COAT. Thin with Pure American Turpentine in the proportion of 1-pint to the gallon of "B.A.L.M." Pure Prepared Paint. This will produce a surface over which the Finishing Coat of "B.A.L.M." Paint can readily [illegible] Where "B.A.L.M." Undercoats are used for Secon[illegible] with 1-gallon American Turpentine to 3-gallon o[illegible]

THIRD COAT—FINISHING. The best results [illegible] by using "B.A.L.M." Paint as contained in the o[illegible] Should thinning be necessary, use Raw Linseed O[illegible]

OLD WOODWORK.

FIRST COAT. For renovating, two coats of Paint are usually specified. The surface must first be dusted down to remove all loose paint, scale, etc. Where the surface is weather-beaten and absorbant, the first coat may be reduced the same as for new work, but in such places as under the eaves and shades, where the full lustre of the old paint remains, the first coat will require to be reduced with Turpentine about 1 pint to the gallon.

SECOND COAT. Use "B.A.L.M." Pure Prepared Paint as contained in the original package.

Painting of Interior Surfaces

NEW WOODWORK.

When the weather is exceptionally humid or cold, it is advisable to use a mixture of Raw Linseed Oil and Turpentine for the first coat, not exceeding ½ pint Turpentine to the gallon of Paint and use Turpentine only for the second coat, about 1-pint per gallon Finishing Coat—"B.A.L.M." Paint as contained in the original package.

OLD WOODWORK.

PREPARATION

The work should be sandpapered smooth and any greasy or smoky surfaces thoroughly cleaned and all worn parts repaired. Where two coats are specified, the first coat should be thinned with Turpentine as for outside old-work. For the finishing coat "B.A.L.M." Prepared Paint as contained in the original package

General Suggestions

Never Prime with Ochres, Mineral Primers or cheap Paint The most important part of painting a building is to start with a hard durable foundation. The use of cheap Primers invariably causes blistering, cracking and undermining of the finishing coat The true test of paint is the result which it gives in actual service, and unless Paint is combined with the proper ingredients, and in the correct proportions, it will not stand the excessive heat and cold and extremes of exposure to which it will be subjected Paint should always be given ample time between coats to thoroughly harden This, however, must not be overdone, especially on outside work, as it greatly impairs the durability of the finishing coat if not completed before weathering commences on the undercoats. Windows and doors should be opened after the Paint used has set, light and air being absolutely necessary for the proper drying of a perfect film.

"Capitol" Paint

A High Grade Zinc Oxide Paint, specially formulated to meet the requirements of State and Municipal Departments, which have legislation restricting the use of Lead Base Paints. "CAPITOL" Paints produce a hard-drying, lustrous film, and are equal in durability on outside exposure to the highest quality imported Zinc Base Paints

"B.A.L.M." Titanium Zinc

A High Grade White supplied in paste form, having a Pigment basis of Titanium White and Zinc Oxide This material is specially suitable as a priming coat and undercoating for "CAPITOL" Paints, as it has good working properties and excellent opacity.

The specifications applying to the application of "B.A.L.M." Pure Prepared Paint also apply to "CAPITOL" Paints

"B.A.L.M." Varnishes

"B.A.L.M." Varnishes are unexcelled for quality. They successfully meet all the demands of actual service and before released are scientifically tested by our technical and expert practical operators. A complete range of Varnishes for interior and exterior requirements are produced under conditions which are necessary for the development and repetition of a high-grade product. The Varnishes suitable for specified purposes are outlined in our booklet, which we are pleased to forward on request.

(Continued on next page)

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

"B.A.L.M." "AUSTRALIN" ENAMEL

An exceptionally White Enamel, drying with a high lustre, and suitable for both interior and exterior use Exterior exposure tests made with "Australin" Enamel and the highest quality British and Continental Enamels have demonstrated its superior durability, and we can unhesitatingly recommend its use for all exterior painting where a high-class durable finish is desired

Spreading capacity approximately 500 square feet per gallon when applied over a smooth, even, previously painted surface.

Specification for application over New Woodwork, Plaster and Concrete Surfaces

PREPARATION. Wood shall be perfectly clean and dry, carefully sandpapered smooth and dusted. Grease or oil spots shall be cleaned off by washing with Mineral Turpentine. Any knots or sappy streaks shall be coated with Shellac Knotting at least 10 hours previous to priming. Plaster, Concrete or Brick surfaces shall be clean and dry, and all loose or scaling particles removed by brushing. If the plaster or concrete is green, or particularly strong in alkali, it shall be neutralised by thoroughly brushing into the surface a solution obtained by dissolving 3 lbs. Zinc Sulphate in 1-gallon of water. After applying the solution, allow to dry, brushing off any loose crystals which may remain. When an especially even and smooth finish is desired, the surface must be sandpapered with No. 00 Sandpaper before the application of the priming coat.

FIRST COAT. "B.A.L.M." Undercoat White thinned 20 per cent. by volume with Genuine Turpentine

SECOND COAT. "B.A.L.M." Enamel Undercoat.

THIRD COAT "B.A.L.M." Enamel Undercoat, to which has been added ¼-gallon Finishing Enamel to the gallon of Undercoat.

FOURTH COAT. "B.A.L.M." Australin Enamel as contained in the original package.

OLD WORK. The surface must be thoroughly cleaned and freed from Oil and Grease by wiping with a cloth damped with Mineral Turpentine.

FIRST COAT. "B.A.L.M." Enamel Undercoat, to which has been added ¼-gallon Finishing Enamel to the gallon of Undercoat

FINISHING COAT. "B.A.L.M." Australin Enamel as contained in original package

"B.A.L.M." FLAT WALL FINISH

[See page 242 for Colour Range]

"B.A.L.M." Flat Wall Finish is made from Non-Poisonous Pigments ground in a specially prepared Linseed Oil base medium, and combines the artistic effects of Kalsomine with the durability of an Oil Paint

"B.A.L.M." Flat Wall Finish may be applied on interior surfaces of wood, metal, brick, concrete and plaster. Being germproof and washable it is a most suitable coating for the interiors of Hospitals, Hotels, Bedrooms, Bathrooms and surfaces where the utmost cleanliness and durability are essentials.

In applying the finishing coat, it is necessary that the Paint be flowed on with a long hair soft brush like an Enamel, not brushed out like an ordinary Oil Paint. Allow not less than 24 hours between coats.

Spreading capacity, approximately 600 sq. ft. per gallon when applied over a smooth, even, previously painted surface.

New Work

PREPARATION The surface must be perfectly dry and all loose or scaling particles removed by brushing All grease or oil spots shall be removed by washing thoroughly with Mineral Turpentine. If the concrete or plaster surfaces on which the coating is to be applied are green or particularly strong in alkali, it shall be neutralised by thoroughly brushing into the surface a solution obtained by dissolving 3 lbs. Zinc Sulphate in 1-gallon of water. After applying the solution, allow to dry, brushing off any loose crystals which may remain, When an especially even and smooth finish is desired, the surface must be sandpapered with No. 00 Sandpaper before the application of the priming coat.

After the application of the first coat, fill all holes or cracks with Plaster of Paris, and when thoroughly dry these must be touched up with Flat Wall Finish shade selected, allowing 24 hours to harden before applying the second coat.

Specifications

SPECIFICATION NO. 1 FOR NEW OR UNPAINTED PLASTER, CONCRETE WALL BOARD OR BRICK.

FIRST COAT "B.A.L.M." Flat Wall Finish, to each gallon of which has been added 1-pint Pale Boiled Linseed Oil.

SECOND COAT. "B.A.L.M." Flat Wall Finish, thinned with 1 pint Pale Boiled Linseed Oil to the gallon of Paint.

THIRD COAT. "B.A.L.M." Flat Wall Finish, as contained in the original package.

SPECIFICATION No. 2 FOR WOODWORK

FIRST COAT. "B.A.L.M." Flat Wall Finish thinned with ¼-gallon Pale Boiled Linseed Oil to the gallon of Paint

FINISHING COAT. "B.A.L.M." Flat Wall Finish as contained in the original package.

SPECIFICATION FOR OLD WORK

PREPARATION. Plaster, brick or concrete shall be carefully brushed to remove scale or loose particles. Holes or cracks to be filled smooth with Plaster of Paris, and when dry shall be touched up with "B.A.L.M." Flat Wall Finish.

FIRST COAT. "B.A.L.M." Flat Wall Finish thinned ¼-gallon Pale Boiled Linseed Oil to the gallon of Paint.

SECOND COAT. "B.A.L.M." Flat Wall Finish as contained in the original package

"B.A.L.M." KALSOMINE

A cold water Paint supplied in powder form and requiring only the addition of water to bring to the correct brushing condition. Applied over interior walls and ceilings it produces an evenly coloured, durable, soft tone finish

SPREADING CAPACITY—One packet of Kalsomine covers approximately 400 sq. ft.

PREPARATION. Surface must be perfectly dry and all loose scaling particles removed by brushing. Fill all cracks with putty made from four parts Plaster of Paris and one part Kalsomine. All ridges and rough plaster should be lightly sandpapered to produce a smooth, even surface.

FIRST COAT. "B.A.L.M." Kalsomine thinned with water to correct brushing consistency

SECOND COAT. "B.A.L.M." Kalsomine thinned with water to correct brushing consistency.

"B.A.L.M." DURAKOTE

A Semi-Paste Water Oil Bound, White Paint, requiring only the addition of water to bring to the correct condition for use. Specially recommended for use over Asbestos and Cement Sheeting, Cement and Plaster Walls and Ceilings. Due to the whiteness and the high opacity of the Pigments used in its manufacture, "DURAKOTE" is unsurpassed in hiding power and its extreme whiteness renders it especially suitable for coating interior walls and ceilings where light reflection is an important factor, such as factory and office buildings.

SPREADING CAPACITY—14 lbs. "DURAKOTE" thinned to the correct brushing consistency will cover approximately 900 sq. ft.

PREPARATION Surface must be perfectly dry and all loose scaling particles removed by brushing. Fill all cracks with a putty made from four parts of Plaster of Paris and one part of "DURAKOTE." All ridges and rough plaster shall be lightly sandpapered to produce a smooth, even surface.

FIRST COAT. "B.A.L.M." "DURAKOTE" thinned with water to correct brushing consistency.

SECOND COAT. "B.A.L.M." "DURAKOTE" thinned with water to correct brushing consistency

(Continued on next page)

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

"B.A.L.M." SPECIAL PAINTS

"B.A.L.M." Industrial Aluminium

"B.A.L.M." Structural Steel Paint

These Paints are specially prepared for painting Structural Steel, Bridges, Pipe Lines, Water Tanks etc The pigments used in their manufacture were selected by reason of their excellent inhibitive properties; the vehicle being a combination of drying oils, producing a film having high moisture resisting properties, which effectively prevents the oxidation of the metal surfaces over which the Paints are applied.

Spreading Capacity Approximately 900 sq ft per gallon

New Work

Preparation.—All sheet metal or steel shall be thoroughly and carefully wire brushed to remove all rust and scale. Badly rusted spots shall be emery papered until the metal is bright and clean All surfaces must be clean and dry and all grease or oil spots washed off with Mineral Turpentine. New Galvanised Iron shall be washed with a solution of Copper Sulphate, using 2 ozs dissolved in a gallon of water.

Specifications

SPECIFICATION No. 1.

PRIMING COAT. "B.A.L.M." Genuine Ready Mixed Red Lead.

SECOND COAT. "B.A.L.M." Structural Steel Paint—thinned with one pint of Turpentine to the gallon of Paint.

THIRD COAT. "B.A.L.M." Structural Steel Paint as contained in the original package.

SPECIFICATION No 2

(Where it is considered that only two coats are necessary.)

PRIMING COAT. "B.A.L.M." Ready Mixed Red Lead to which has been added 50 per cent. by volume "B.A.L.M." Structural Steel Paint shade selected

SECOND COAT. "B.A.L.M." Structural Steel Paint as contained in the original package.

OLD WORK

PREPARATION All loose scale or rust shall be wire brushed, until the metal is bright and clean. Where bare metal is exposed, apply a priming coat of "B.A.L.M." Genuine Ready Mixed Red Lead.

FINISHING COAT. "B.A.L.M." Structural Steel Paint as contained in the original package.

Where the surface is to be finished in Aluminium, it is advisable to apply two coats of "B.A.L.M." Industrial Aluminium over the Red Lead Primer.

"B.A.L.M." Roof and Bridge Paint

A high-grade inhibitive paint for painting galvanised roofs and metal surfaces subject to normal conditions and exposures.

Spreading Capacity—Approximately 900 sq. ft. per gallon on a previously painted, smooth, even surface

New Work

Preparation. All sheet metal or steel shall be carefully wire brushed to remove all rust and scale. Badly rusted spots shall be emery papered until the metal is bright and clean. All surfaces must be clean and dry, and all grease or oil spots washed off with Mineral Turpentine

New galvanised iron shall be washed with a solution of Copper Sulphate, using 2 ozs. dissolved in a gallon of warm water. When dry, priming coat of paint may be applied

Specifications

SPECIFICATION No. 1.

FIRST COAT. "B.A.L.M." Genuine Ready Mixed Red Lead.

SECOND COAT. "B.A.L.M." Roof and Bridge Paint, shade selected.

If the shade selected be gray, it is advisable to first coat with a mixture consisting of equal parts of Genuine Ready Mixed Red Lead and "B.A.L.M." Roof and Bridge Paint, gray shade selected

In certain cases, when painting new work, one coat may be considered satisfactory, in which instance use "B.A.L.M." Roof and Bridge Paint as contained in the original package.

OLD WORK

PREPARATION All loose scale or rust shall be wire brushed until metal is bright and clean. Where bare metal is exposed apply a priming coat of Roof and Bridge Paint, shade selected or preferably "B.A.L.M." Red Lead Primer

FINISHING COAT. "B.A.L.M." Roof and Bridge Paint, shade selected, as contained in the original package.

"B.A.L.M." Cement and Waterproof Paint

"B.A.L.M." Cement Paving Paint

"B.A.L.M." Cement and Waterproof Paints and "B.A.L.M." Cement Paving Paints are decorative and preservative coatings for application over interior and exterior concrete surfaces, plaster walls and brickwork

"B.A.L.M." Cement and Waterproof Paint whilst designed primarily for the protection of concrete surfaces adds greatly to the decorative effect. Because of its porous and absorbent nature, the use of paint on concrete buildings is desirable. By filling up the pores with "B.A.L.M." Cement and Waterproof Paint rain does not penetrate the concrete surface, the walls thus being rendered damp-proof. Painting also covers unsightly stains due to the exhudation of alkali salts, and because of the smoother surface produced by painting, offers less opportunity for the lodgment of foreign particles, thereby diminishing the effects of outside influences such as soot, smoke or dirt

SPREADING CAPACITY—Depends upon the nature of the surface. On concrete it will cover approximately 500 square feet per gallon (1 coat). Over smooth surfaces it will cover approximately 700 square feet per gallon.

New Work

Preparation. No paint shall be applied to concrete surfaces or plaster walls that have not aged for at least 90 days.

Wire brush to remove all loose particles. If the surfaces to which "B.A.L.M." Cement and Waterproof Paint is to be applied are green or strongly alkaline apply a neutralising coat, consisting of 5 lbs. or 6 lbs. of Zinc Sulphate dissolved in 1 gallon of water. This solution to be well brushed into the surface and allowed to thoroughly dry, brushing off any loose crystals formed before painting

Owing to the porous nature of cement and brick surfaces, it is essential that painting work be carried out only in dry weather, and that no moisture is lodged in the surface to be painted.

Specifications

SPECIFICATION No. 1

FIRST COAT. "B.A.L.M." Cement and Waterproof Paint, or "B.A.L.M." Cement Paving Paint, shade selected.

SECOND COAT. "B.A.L.M." Cement and Waterproof Paint, or "B.A.L.M." Cement Paving Paint, shade selected.

In certain cases it may be necessary to apply three coats to concrete and plaster walls. In such instances the second coat may be thinned with 1 pint of Turpentine to the gallon of Paint.

In painting over unpainted brickwork it will invariably be found that three coats are necessary. Furthermore, the joints will need to be puttied over with coloured putty after the application of the first coat.

OLD WORK

PREPARATION. Wire brush to remove loose or scaly particles. Touch up any bare spots with "B.A.L.M." Cement and Waterproof Paint in the shade selected.

All greasy surfaces to be thoroughly cleaned and wiped with a cloth damped with Mineral Turpentine.

SPECIFICATION No 1

FINISHING COAT. "B.A.L.M." Cement and Waterproof Paint, shade selected

(Continued on next page)

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

The use of soluble cellulose as a means of producing a finish on furniture and fittings and other wooden articles is finding increased favour amongst manufacturers whose output demands speed and at the same time a good class article.

Amongst the advantages offered to furniture manufacturers by the use of the "Duco" process may be mentioned the following

1. "Duco" Lacquer is a more rapid method of polishing than French polishing

2. Whilst a nitrocellulose wood finish is more expensive than shellac its application costs considerably less in skilled labour than French polishing

BRITISH AUSTRALIAN LEAD MANUFACTURERS PTY. LTD.

We have acquired the sole manufacturing rights for "DUCO" LACQUERS and all other "DUCO" PRODUCTS IN AUSTRALIA. We guarantee in all our Manufactures of "DUCO" that the DUPONT FORMULAE HAVE BEEN ADHERED TO

All Packages bear the registered TRADE MARK

DUCO

WHICH IS OUR SOLE PROPERTY

MELBOURNE: SYDNEY: ADELAIDE

The advantages of "Duco" Wood Finish over French polish are:—

1. "Duco" Finish is tougher and less liable to chip, thereby standing up better to hard wear.

2. "Duco" Finish has a more pleasing feel and is not sticky.

3. "Duco" Finish will not stain or dissolve when alcoholic or other liquids are poured upon it.

4. "Duco" Finish is unaffected by hot water

5. A damaged surface can be repaired comparatively easily, which is not possible with French polish

It is obvious that the exact process to be adopted will vary according to different conditions of application and the finish it is desired to obtain. B.A.L.M., or their Agents, will be very pleased to offer advice where this is desired, but the following general notes may be taken as applying to all processes for furniture and interior fittings.

Preparation of the Wood

The more thorough the preparation of the wood, the cheaper is the ultimate finish, and if the wood is not scraped it is recommended that it be thoroughly sanded with Paper No. 320. Should a coarser paper be necessary, Paper No 0 should be employed, and the scratches resulting from this operation should be carefully sanded out with Paper No. 320

Staining

It is necessary to call the attention of users to the fact that where it is desired to use a stain or filler with which the customer is already familiar, "B.A.L.M." cannot vouch for the results obtained by applying cellulose over such preparatory coats. They may or may not be suitable, but it is strongly recommended that use should be made of the very full range of suitable stains and fillers which are manufactured expressly for use under "Duco" Lacquer.

"Duco" Wood Finish is almost colourless, and the colour desired, therefore, should be obtained, as closely as possible, with the stain and filler The filler should always be at least slightly darker than the stain, so as not to show up light in the grain

There are two types of stains—Water Stains and Naphtha Stains. Water Stains are the less fugitive, but Naphtha Stains give the quicker job and do not raise the grain.

Naptha Stains

A range of special Naphtha Stains is available, which may be applied either by hand or by spray If lighter shades are desired, "Duco" Stain Thinner should be used to dilute the "Duco" Naphtha Stains

Naphtha Stains dry quickly, and the wood is generally ready for filling in one hour after staining

Papering

When Naphtha Stain is employed the grain will not be raised, and consequently papering is not necessary, but in the case of Water Stains a light papering with Paper No 320 should be given Should the grain be badly raised, it may be necessary to give a light wash coat of finish previous to papering, in order to protect the stain from being rubbed off

Filling

If a filled grain is required, a complete range of "Duco" Wood Fillers is available.

Filling over Naphtha Stains needs more care than over Water Stains, as rubbing in the Filler tends to remove the staining effect of the Naphtha Stain.

The Filler should be brushed on and allowed to dry for five minutes until the surface appears dull all over It should then be wiped off with a rag across the grain so as to pack it well into the pores. Particular care should be taken to see that the surface is wiped off clean, special attention being given to any corners, joints, etc

Where speed of operation is essential, it is quite practicable to thin the Filler with turpentine or white spirit to a thick spraying consistency, applying by means of a spray In the case of large pieces of furniture, this method presents the additional advantage of allowing a spray operator to apply the Filler and to be followed by a boy for the purpose of rubbing the Filler into the grain and cleaning off the work

The Filler should be allowed 24 hours to dry, and for permanent work on mahogany it is essential that the Filler should be absolutely bone dry, otherwise the pores of the wood will appear grey and sinking and other troubles are liable to occur. The drying time is not so important in the case of oak, since a perfectly filled job is rarely required.

Matching-up

The best method of matching-up is to apply a wash coat of "Duco" Wood Finish when the Filler is thoroughly dry This wash coat should consist of four parts of Thinner to one part of Finish, and should be lightly and evenly sprayed over the surface After allowing one hour to dry, matching-up may be done with the spray, using the appropriate Naphtha Stain The Wood Finish may be applied immediately after the matching-up Stain. It is emphasised that the wood should be stained in the first instance to match the shade required, so that matching-up may be reduced to the minimum. Naphtha Stain when used for matching-up should be applied as sparingly as possible to avoid slow drying and subsequent bleeding

Sealing

We have found that "Duco" Lacquer Clear Finish is most durable when applied directly on the wood. "Duco" Wood Finish can therefore be applied immediately after the wood is filled, but in order to provide a first coat with good build and easy sanding property we have developed a Sealer

This is a durable, easy sanding, nitro cellulose product which dries very quickly, and can be sanded after one hour It gives excellent body and can be sanded very easily.

It is slightly milky in appearance, but dries on the wood comparatively clear

Method of applying "Duco" Wood finishes

In most cases it will be found necessary to thin "Duco" Wood Finish, for which purpose special "Duco" Thinners are supplied. Owing to the varying conditions under which application might take place, it is impossible to lay down definite proportions, but the discretion of the user must be exercised in this matter A few trials will soon show the amount of Thinner which gives the best results An interval of three hours is recommended between each coat, as the longer interval tends to eliminate the risk of subsequent sinking troubles, but this period can be reduced at the discretion of the user. When each coat is dry, it should be lightly sanded with No. 400 waterproof paper and water The number of coats required will depend on the degree of finish which it is desired to obtain and also upon the quality of the wood in use

(Continued on next page)

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

Levelling and Bodying-up

When the finish, straight from the spray gun, gives too much of a varnished appearance, a level surface may be obtained either by bodying-up with "Duco" Bodying-up Fluid, alone or by first sanding with No. 400 Paper, and then following this operation with bodying up. The choice between the two methods depends largely on the individual conditions of the factory and the available labour

The art of obtaining a level bright finish with the Bodying up Fluid lies in the manipulation of the pad, but it is not so distinctive an acquisition as is the use of the French polish rubber. The pad consists of cotton wool covered with a piece of chamois leather. The Bodying-up Fluid should be used liberally and the pad pressed out flat and moved with a circular motion over the area to be bodied-up finally finishing off with even strokes along the grain. With a little practice it is possible to obtain a perfectly bright and satisfactory finish in this way, and it is a speedier operation even than the process of spraying shellac polish and levelling off by hand If a second bodying-up is required, an interval of at least one hour should be allowed between operations

The bodying-up operation is the only one in the process requiring any considerable amount of skill, and this can be achieved quite readily with very little practice.

After the bodying-up is finished, if a pad well wetted with Bodying-up Fluid is passed lightly and deftly along the grain, a bright finish will result which compares favourably with the result generally desired in French polish.

Satin finish

A satin finish may be obtained either with or without rubbing. Where rubbing can be allowed a rag pad sprinkled fairly liberally with finest pumice and damped with water should be rubbed along in the direction of the grain More water should be added to the work by degrees without the addition of any more pumice, the pumice and water thus gradually becoming a fine slush which takes out the scratches made at the beginning of the operation.

Where rubbing cannot be undertaken, a particularly useful material is available known as "Duco" Flat Wood Finish, by means of which a flat satin effect can be obtained direct from the spray gun. In order to avoid hiding the beauty of the grain, it is better to obtain the body of the finish with coats of "Duco" Clear Wood Finish and then to give a final coat of "Duco" Flat Wood Finish. The degree of dullness can be regulated by mixing the standard Wood Finish with "Duco" Flat Wood Finish

The satin finish described above, obtained as it is direct from the spray gun without any hand rubbing, cannot be expected to give that silky feel associated with a rubbed cellulose finish. A combination of these methods, however, is often very useful, for example, the sides and legs of a satin finished article may be finished with "Duco" Flat Wood Finish, while the top may be treated with "Duco" Clear Wood Finish flatted with pumice as described above.

Rubbed or Jacobean finishes

Rubbed effects on oak may be obtained in three different ways:—

1 The wood may be stained with dark water stain and the rubbed portion cleaned up with sand paper so as to produce a lighter colour.
2 The bare wood may be sprayed with a light coat of wood finish on the portion which it is desired to keep light in colour. Water stain is then swabbed on, and will take more deeply in those parts of the wood which are unprotected by the wood finish. The light coat used for this purpose should consist of about four parts of Thinner to one part of Wood Finish
3. The bare wood may be stained lightly with Naphtha Stain or half-filled with Filler (which also has staining properties), and the dark portion may be shaded in with Naphtha Stain, using the spray pistol.

Repairing

"Duco-finished" furniture and fittings are harder to scratch, dent or mar than furniture finished with ordinary materials. Certain mishaps are bound to occur, however, and in such instances it will be necessary for the dealer to repair the damage.

Contrary to a false impression held by many, fostered mainly through lack of knowledge of the actual conditions rather than personal experience, it is no harder to touch-up furniture finished with "Duco" Lacquer than it is to repair ordinary finishes. Small dents or abrasions on "Duco finished" furniture may be repaired by burning in stick shellac in exactly the same manner as employed for repairing varnish-finished pieces. The hardest stick shellac should be employed for this purpose.

Where the damage place is large or has ragged edges we suggest the repair work be done as follows:—

Sand down the damaged spot with fine sandpaper, then stain in the usual manner to obtain the desired colour Apply Clear "Duco" with a small fitch hair brush, putting on as much material as possible with one stroke of the brush. Allow to dry for about 30 minutes, and repeat the operation until the surface is brought up to or above the surrounding finish. (The "Duco" Clear can be secured from us or from the manufacturer of the furniture or fittings to be repaired) Allow the last application to dry overnight and rub to a smooth surface, level with the surrounding finish, in the usual manner with FF Pumice and water

If it is desired to touch up the damaged place by padding, a very small amount of pure linseed oil should be used on the pad, and "Duco" Clear should be used in place of shellac.

Guarantee

"Duco" products for the finishing of furniture and fittings do not contain Benzol or any ingredients injurious to the health of the user

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"Duco" Lacquers

These are supplied in various lines which have been developed with properties which makes them admirably suited for either Automobile Finishes or Industrial purposes generally. The Automotive Lacquer is pre-eminent in its qualities and has been formulated in such a manner as to give the maximum of durability and gloss which is so much desired in the motor field. Complete specifications for application are supplied to users.

"Duco" Industrial Lacquer Enamels

Cellulose as a decorative medium has come rapidly into favour on account of its hygienic and durable surface, whether applied to metal, wood, or plaster. It is particularly useful as a quick drying and artistic finish and never has the cheap appearance of many oil enamels and varnishes. In the case of maintenance work for theatres, departmental stores, hotels, restaurants and kitchens, etc., where rapidity of work coupled with a high-grade finish is essential, "Duco" Industrial Lacquers are unequalled.

Dust does not adhere readily to the surface and they are particularly water resistant and not easily marred by hot utensils. They dry with a pleasing degree of gloss and can if required be polished to a higher gloss resembling a buffed effect

Metal Lacquers

Metal Lacquers are for interior use and are water white and may be applied to a metal surface without affecting the colour or finish. They prevent tarnishing of silver, brass and copper by protecting it from contact with the atmosphere.

Leather Lacquers

These are particularly suitable for upholstery work and are supplied in a range of colours. A study of Leather Lacquers has been made from a point of view of producing a finish with a maximum of flexibility, together with the natural finish of the leather. It is necessary to remove all grease with Mineral Turpentine or Methylated Spirits before the application of the Lacquer

"Duco" Bronzing Liquids

These are designed to act as a conveyor for Bronze or Aluminium Powders. The Powder is mixed with the liquid and this combination is then applied to the articles to be coated. The film deposited by the liquid holds the powder in position and protects it from tarnishing. The result is to give the article the appearance of being coated with gold, silver, bronze or copper, according to the kind of powder used.

(Continued on next page)

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DULUX

FINISHES

Superseding Enamel

A MODERN MIRACLE—A NEW AND SENSATIONAL DEVELOPMENT IN FINISHING MATERIALS, THAT SETS NEW STANDARDS OF DURABILITY

For many years we have combined scientific and technical research with practical paint experience in the search for new products of outstanding durability and service value. As a result of this work we now introduce a new and revolutionary product—Dulux Finishes.

Dulux is a distinct type of finish, having characteristics of its own—characteristics that mark it as one of the most outstanding contributions to exterior and interior finishing of all kinds.

In the formulation of any finishing material there are two important factors that must be considered.

1. **The pigment, which gives colour, hiding power and body.**
2. **The vehicle, which holds these pigment particles in place and forms a continuous adherent film.**

In general paint practice it has been found that the vehicle of a paint, varnish or enamel is the first of the two components to disintegrate. Regardless of this fact far greater attention has been given to the selection of pigments and pigment combinations than to the vehicle, with the result that ordinary finishes have never possessed greater durability than was inherent in the commonly available vehicles We have spent many years in pigment development, being manufacturers of a number of important pigments. We have concentrated on the weak points of paint and enamel films, with the result that new and more durable binding materials have been developed—Dulux vehicles. As a result of this development, it is now possible to produce finishes from vehicles which will hold the pigment in place, without disintegration over a considerably longer period of time.

Dulux vehicles are a development of our Company. They have none of the properties commonly associated with the usual resins, gums and oils used in paint manufacture. They are distinct chemical compounds—the result of a scientific chemical process.

Dulux vehicles are made by chemical reactions and require extremely close chemical control. Their properties depend as much upon the method of manufacture and upon control during manufacture as they do upon the ingredients used.

"Dulux" Vehicle for Painting

In Dulux finishes for exterior and interior painting, an oil-like vehicle is used to give ease of application and maximum durability. This material gives softer but even more durable films than the gum-like vehicle used in Dulux for enamelling. Dulux oil, like Dulux gum, is a synthetic product and has no relationship to the materials ordinarily used at present in the paint trade. It has no relationship, for example, to the so-called thinning oils, which are really varnishes containing brittle resins

Dulux Oil is a true synthetic oil in which no brittle material has been incorporated.

Finishes made from Dulux Oil are used in the places where linseed oil or chinawood oil paints are now commonly used, as, for example, on building exteriors, bridges, steel work, etc.

Dulux Finishes are supplied in a Paint, Enamel and Varnish type and can in general be used in exactly the same manner as the orthodox products. The Paint type possesses the following characteristics:—

Durability of "Dulux" Finish

Extensive tests have been carried out in order to determine the durability of Dulux Products in comparison with orthodox materials. These tests have demonstrated that Dulux materials have from 50 to 100 per cent greater durability.

"Dulux" Finish Resists Chalking

The Dulux Medium used in conjunction with free chalking Pigments demonstrates that this reduces the tendency of chalking. At the same time Dulux Products retain just sufficient chalking to eventually produce a surface suitable for refinishing without the removal of the old finish, therefore leaving an ideal surface for recoating

"Dulux" Finish Resists Cracking

Likewise the Dulux Medium prevents cracking. Tests have demonstrated that Dulux Products show much less tendency to cracking than do the orthodox materials. This is a decided advantage in that it produces the ideal surface for repainting. Because of the hard, impervious film produced by Dulux vehicle, such finishes are more resistant to the action of alkali in soap and washing compounds than are orthodox products. Surfaces are therefore more easily kept clean

Mildew Resistance

Under conditions of shade and dampness, orthodox Paints frequently blacken and discolour, due to the growth of mould and fungus on the paint surface. This is frequently encountered on the shady side of exterior surfaces. It has been found that the hard, smooth surface of the Dulux Finish makes it difficult for mould and fungus to get a footing and grow. As a result, Dulux Products retain their appearance much better than orthodox Paints under conditions normally conducive to fungus growth.

"Dulux" Products Resist Corrosion

For the protection of metal, the same qualities are required as for the protection of wood, viz, resistance to cracking and flaking and retardation of chalking to the point where the film wears away slowly, rather than rapidly. In addition to resistance to cracking and chalking, a metal protective paint must also be impermeable to moisture. The impermeability of Dulux vehicle on test has demonstrated that it is superior to the best orthodox products known.

Drying of "Dulux" Finishes

Dulux Finishes, because of the quick drying properties of the vehicle, are not so greatly affected by adverse weather conditions as are the usual Oil Paints. Under ordinary conditions Dulux Finishes for exterior and interior painting are dust free in three to six hours, and dry hard enough for recoating in from eight to eighteen hours. This quick drying is of particular advantage as a protection against dust-storms and insurance against spoiling of the finish through collection of insects, etc The rapid drying of Dulux Products results in fewer jobs being spoilt by sudden showers.

(Continued on next page)

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"Dulux" Enamel Type

This is characterised by its free flowing, glossy film, quick drying, and durability far superior to orthodox Enamels. In addition to this it shows excellent resistance to Oil and Petrol. The hard surface is particularly resistant to marring, and is heat-resistant, showing very little effect when continually subjected to temperatures of from 200 to 250 deg. Fahr.

It can be applied by either spray or brush methods and finds considerable use in the finishing of Petrol Pumps, Truck Bodies, Motor Cars, Rail Cars, Tram Cars, also Furniture and Fittings in the home and public buildings.

Dulux Finish Enamel type is supplied in two lines, one drying to a dust-proof stage in ½-hour, which allows for the application of a further coat within 1½ hours, thus placing the user in a position to finish a job in one day This type has been designed principally for spray application, but is quite suitable for brush application over small surfaces. The other line is slower drying and is designed principally for brush application. It can, however, be sprayed equally as well as the fast-drying line Overnight drying, however, is necessary between coats

"Dulux" Clear Varnish Type

This can be applied by either brush or spray. The brushing properties are equal to the best working orthodox Varnish. For spray application a 10% reduction with Turpentine is recommended, and for finishing new and old work, two coats are advised with a minimum overnight drying between coats.

Dulux Clear may in general be used in the same way as orthodox Varnishes, with the exception that it is not intended for mixing with such Varnishes, Paints or Enamels. It can, however, be mixed with Dulux products where a higher gloss is desired, or may be applied over the Enamel type of Dulux

The drying period under normal conditions is approximately eight hours to the dust free stage, drying to an extremely hard surface in eighteen hours. Variations in temperature and humidity do not affect Dulux Clear to the same extent as orthodox Varnishes are affected Durability and service value under normal outdoor conditions of exposure are also from 50 to 100 per cent greater, and the hard, tough film, which is characteristic of Dulux Clear, is easier cleaned and is more resistant to Oil, Petrol and marring

There are Distributing Agents for "B.A.L.M." Brand Products in every State in the Commonwealth

25 COMMONWEALTH LITHARGE & RED LEAD PTY. LTD.

CABARITA, N.S.W.

C.L. & R.L.

Despite the many and varied substitutes placed on the market, none has yet been found to equal Red Lead in its protective qualities when used as a priming coat on iron and steel work

The Commonwealth Litharge & Red Lead Pty Ltd.'s modern mechanical plant at Cabarita was designed and constructed on the accumulated experiences of the leading Lead Oxide firms in Great Britain, and this company holds the Australian patent rights to this process

The Pig Lead used is of one brand only B H A S "Special." Thus, in addition to its being a wholly Australian product, the quality of the finished material is more consistent than would be the case with a lead drawn from a variety of sources.

Red Lead for Paint is manufactured in two grades, viz.:—

Ordinary Genuine Red Lead,
Non-setting Red Lead.

Ordinary Genuine Red Lead is made to the Australian Commonwealth Standards Association

No organic colouring matter whatever is introduced.

Non-setting Red Lead, which conforms to the specification of the British Standards Association, remains in paste form for an indefinite period when ground in Refined Linseed Oil.

Other grades of Red Lead manufactured are
Accumulator Manufacturers' Quality,
Glass Makers' Quality

Litharge

Several varieties of Litharge are manufactured

Flake Litharge is used in the Varnish making and Oil Boiling trades.

Ground Flake Litharge. This is also used in the above trades as well as for pasting Lead Storage Battery plates

Canary Litharge. This is a particularly pure grade of Litharge. Owing to its fine state of division, Canary Litharge is more easily soluble than the coarser varieties, but it is advisable to mix it into a paste with Linseed Oil before adding it to the solution in Varnish-making or Oil Boiling, otherwise it is inclined to "ball"

Canary Litharge is recommended for colour making owing to the absence of metallic impurities, metallic lead and silicious matter

Other uses for this grade of Litharge are Rubber Manufacture and Accumulator manufacture.

Special Battery Oxide. Specially made for Accumulator Manufacture.

Lead Sub-Oxide. This is a mixture of Lead Sub-Oxide (Pb_2O), Lead Monoxide (Pb O) and Metallic Lead, and is used for pasting Lead Storage Battery Plates.

It is worthy of note that this company was the first to manufacture Red Lead on a commercial scale in Australia.

The Plant, easily the largest in the Commonwealth, is run under strict laboratory control, with the result that the finished products are of a consistently high grade.

Red Lead has for years been known as the material "par excellence" for use in the manufacture of Priming Paints for painting Structural Steel, and in Modern Building Construction in which steel plays such an important part Architects and Engineers will be well advised to ensure protection against corrosion by specifying Red Lead Priming Coats for all Steel Work.

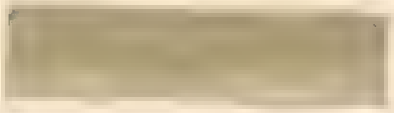
Paint manufacturers producing structural steel paints can rest assured that in buying C.L. & R.L. Red Lead they have available a material which conforms in every respect to the rigid requirements of the Australian Standards Association Specification for Red Lead.

Of special importance to manufacturers of Red Lead Priming Paints is our Non-Setting Red Lead, which may be ground in Oil or mixed ready for use without any tendency to hardening in the package

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

Colour Range of Prepared Paints

IVORY


SILVER GREY

AZURE BLUE

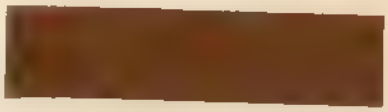
CREAM

FRENCH GREY

RED

LIGHT STONE

PEACH BLOW


GOLDEN BROWN

MIDDLE STONE

PEA GREEN

DEEP RICH BROWN

BUFF

BRIGHT MOSS GREEN

VERMILION

TERRA COTTA

INDIAN RED

VELVET BROWN

DARK STONE

IMPERIAL IVY GREEN

MAROON

See Pages 234 and 243 for Technical Descriptions and Specifications of these Paints

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

Colour Range of Flat Wall Finishes

LIGHT STONE

LILAC

SILVER GREY

IVORY

ADAM GREEN

FAWN

CREAM STONE

SEA GREEN

BISCUIT

PEACH BLOW

SAGE GREEN

BUFF

PINK

PALE GREY GREEN

TAN COLOUR

LIGHT WEDGEWOOD BLUE

PINK MAUVE

DARK BROWN

PALE BLUE

BLUE

MAROON

See Pages 235 and 243 for Technical Descriptions and Specifications of these Finishes

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

AUSTRALASIAN UNITED PAINT CO. LTD.

MANUFACTURERS OF HIGH-GRADE PAINTS, ENAMELS, COLOURS, &c.

Telegraphic Address,
UNITED PAINTS, PORT ADELAIDE.

Cable Address:
UNITPA, PORT ADELAIDE.

Works:
LIPSON STREET, PORT ADELAIDE, S.A.

POST OFFICE BOX 95,
PORT ADELAIDE, S.A

25

S.A. File No.

In presenting the following resume we would direct particular attention to its construction, wherein each product is dealt with in a practical manner, reference to which will readily equip you with the essentials of each particular line, especially in regard to methods of application

The variety of our range of Australian manufactured lines provides the fullest choice of highest grade Paint products, the formulæ of which have been produced with the most careful consideration to the requirements of the Architectural profession.

"UNITED" Paint Economy.—The cost of labour in painting is far greater than the cost of Paint. The Paint, therefore, which gives the greatest durability is the cheapest Paint to use. "UNITED" Paints, which are made in Australia for Australian conditions, have proved their superiority in this respect.

"UNITED" PURE PREPARED PAINT

[See Page 241 for Colour Range]

"United" Pure Prepared Paint is manufactured from Genuine Australian Stack-made White Lead, Pure Australian made Zinc Oxide, Australian made Genuine Refined Linseed Oil, Pure American Turpentine and the necessary quantity of Liquid Drier This combination has proved, through long years of atmospheric exposure tests, to be the most durable Paint that it is possible to produce. The Stainers used in the preparation of the coloured Paints are of the finest quality, regularly tested and standardised in our well-equipped Laboratories to ensure uniformity of colour, permanency and durability

Covering Capacity.—Approx. 850 sq. ft. per gallon.

"UNITED" Undercoats.

These are made in White and five shades and are specially prepared as Undercoats for the regular "UNITED" Paints They are prepared to a heavy bodied condition, thus permitting the addition of Linseed Oil or American Turpentine, as the case demands, without detracting from their good covering properties The great advantage in the use of these Undercoats is that the surface over which the finishing coat of "UNITED" Paint is applied is in an ideal condition, thus ensuring the best possible results in general appearance and durability of film

SPECIFICATIONS

EXTERIOR PAINTING

NEW WORK.—The surface to be painted must be dry and free from dust and dirt. Coat all knots, pitchy or sappy streaks with one coat of Patent Knotting

FIRST COAT should be thoroughly primed with "UNITED" Undercoat, thinned in the proportion of 1-pint of Raw Linseed Oil to the gallon of Undercoat, for all porous timbers, where the surface is hard and non-porous, Turpentine only should be added in the same proportion.

SECOND COAT.—Thin "UNITED" Undercoat with 1-pint of Turpentine to the gallon of Undercoat.

THIRD OR FINISHING COAT.—Use "UNITED" Paint as it comes from the tin. During winter months (May to August) when excessive moisture is present in the atmosphere, a small quantity of Terebine may be added to the finishing coat to accelerate drying.

OLD WORK.—The surface must first be scraped or sandpapered and dusted down to remove all loose paint scales, &c. Where the surface is porous and 2 coats are necessary, the first coat should be thinned with ½-pint of American Turpentine and ½-pint of Raw Linseed Oil to the gallon of Paint, finishing with "UNITED" Paint as it comes from the tin. Where only 1 coat is considered necessary use "UNITED" Pure Prepared Paint as it comes from the tin.

PAINTING IRON.—Iron rarely requires more than 2 coats, and in many cases where dark colours are used one coat is found sufficient. When 2 coats are necessary, reduce the paint for the first coat with 1-pint of Turpentine per gallon, finishing with "UNITED" Pure Prepared Paint as it comes from the tin

INTERIOR PAINTING

INSIDE APPLICATION—NEW WOODWORK

When the weather is exceptionally humid or cold, it is advisable to use a mixture of Raw Linseed Oil and Turpentine for the first coat, not exceeding ½-pint Turpentine to the gallon of Paint, and use Turpentine only for the second coat, about 1 pint per gallon.

OLD WOODWORK.—The surface to be painted should be thoroughly sandpapered down, and any greasy or smoky surfaces washed with a weak solution of soda. Where two coats are specified the first coat should be thinned with 1-pint of Turpentine to the gallon of Paint, and a finishing coat of "UNITED" Pure Prepared Paint as it comes from the original package.

"UNITED" FLATKOTE

[See Page 242 for Colour Range]

"UNITED" FLATKOTE is a durable, non-poisonous, sanitary and washable wall coating for interior decoration. It is an ideal finish for use on plastered walls, woodwork, ceilings or composition board in hospitals, hotels, churches and all interior surfaces where cleanliness and durability are essential.

"UNITED" FLATKOTE is easily applied, having free brushing and flowing properties, and drying with a beautiful matt finish which does not show brush marks or laps.

Covering Capacity.—Approx. 600 square feet per gal

SPECIFICATION FOR NEW PLASTERED WALLS, WOODWORK, CEILINGS AND COMPOSITION BOARD.

First Coat. Use from 1 to 2-pints of Flatkote Priming Liquid to 1-gallon of "UNITED" FLATKOTE

Second Coat. "UNITED" FLATKOTE thinned with 1 pint of Turpentine to 1-gallon. Allow 48 hours to harden.

Finishing Coat.—Apply "UNITED" FLATKOTE as it comes from the tin. If thinning is necessary use Turpentine sparingly

Important.—It is necessary that all cracks and holes in walls be stopped with plaster wetted with FLATKOTE. This should be applied after the first coat and allowed to thoroughly harden for 24 hours before application of the second coat.

SPECIFICATION FOR OLD WORK.

The plaster, brick or concrete shall be carefully wire brushed to remove scales or loose particles. Holes or cracks to be filled with a putty made from "UNITED" Flatkote and P[illegible] of Paris, and when dry touched up with "UNITED" [illegible] shade selected

First Coat.—Thin "UNITED" FLATKOTE with 1-pint [illegible] "UNITED" FLATKOTE Priming Liquid to the gallon of Paint, and apply as for new work

Finishing Coat.—"UNITED" FLATKOTE, shade selected, as contained in the original package.

(Continued on next page)

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

"UNITED" CEMENT AND WATERPROOF PAINT

"UNITED" Cement and Waterproof Paint is a scientific preparation manufactured for waterproofing and decorating concrete, cement, plastered walls, and brick surfaces, both interior and exterior. The specially prepared mediums used in "UNITED" Cement and Waterproof Paint are not in any degree injurious to the texture of concrete and cement, and the pigments have been carefully selected to obtain the most durable film combined with permanency of colour

The use of "UNITED" Cement and Waterproof Paint gives to the surface a coating which is impervious to all disintegrating influences, and its waterproofing properties when applied to exterior surfaces considerably improves conditions for interior painting

Covering Capacity.—Approx. 500 sq. ft. per gal. over new cement

SPECIFICATIONS

New Work

Wire brush to remove all loose particles.

To overcome possibilities of action by free lime it is recommended to first use a neutralising coat of Zinc Sulphate, consisting of 3 lbs. of Zinc Sulphate to 1-gallon of water

Moisture is responsible for many paint complaints, and if it is sealed in the surface with a coat of paint it will eventually find its way out, mostly in the form of blisters or flakes, and for this reason we recommend allowing all new cement surfaces at least 3 months before a coat of paint is applied.

For best results on concrete of ordinary texture, 2 coats are sufficient. Where the concrete is coarse 3 coats may be required.

FIRST COAT.—Reduce "UNITED" Cement and Waterproof Paint with 1-pint of Turpentine to the gallon

SECOND COAT (Finishing).—"UNITED" Cement and Waterproof Paint as contained in the original package.

Where 3 coats are necessary the second coat should be reduced in the same proportions as for the first coat.

Old Work

Remove all loose particles with wire brush and thoroughly dust down surface.

FIRST COAT.—Reduce "UNITED" Cement and Waterproof Paint with 1-pint of Turpentine to the gallon of Paint.

SECOND COAT.—Use "UNITED" Cement and Waterproof Paint as contained in the original package.

Where the surface is in good condition one coat only may be necessary, which should be applied as contained in the original package

"UNITED" HIGH GRADE ENAMEL

"UNITED" High Grade Enamel is the highest grade Enamel produced. It is ideal in its working and flowing properties, and dries with a porcelain finish which is both sanitary and durable. It is suitable for all interior and exterior work where a high grade finish is desired

It has withstood the test against all other Enamels on hospital interiors, bathrooms, halls and other places where the surface is continually being cleansed with strong soap solutions, disinfectants, etc.

Covering Capacity.—500 square feet per gal. (approx.)

SPECIFICATIONS

NEW WOODWORK

New Woodwork should receive a priming coat of Genuine White Lead, thinned with equal parts of Raw Linseed Oil and Turpentine, with the necessary quantity of Drier or "UNITED" Genuine Ready-Mixed White Lead Paint reduced in the proportion of 1-pint of Turpentine to the gallon of Paint. After same is thoroughly dry, fill all holes, cracks or joints with a putty made from whiting wet up with "UNITED" Enamel Undercoat, and sandpaper when dry.

SECOND COAT.—Apply a coat of "UNITED" Enamel Undercoat, allowing 24 hours drying.

THIRD COAT.—Same as for Second Coat.

FINISHING COAT.—Apply a full finishing coat of "UNITED" High-Grade Enamel as it comes from the tin. If necessary thin sparingly with Pure American Turpentine.

NEW PLASTERED WALLS should first receive a coat of "UNITED" Priming Liquid instead of White Lead Paint, after which follow the same procedure as for new woodwork, eliminating if necessary one coat of "UNITED" Enamel Undercoat.

OLD PAINTED OR ENAMELLED SURFACES.—Thoroughly clean the surface with water in which a little soda has been added to remove smoke, grease and dirt, after which sandpaper smooth with fine sandpaper and apply 2 coats of "UNITED" Enamel Undercoat, finishing with a full coat of "UNITED" High-Grade Enamel as it comes from the tin.

"UNITED" OIL VARNISH STAINS

"UNITED" Oil Varnish Stains are specially recommended for application to interior surfaces, such as floors, window frames, doors or any section of interior decoration where the natural colouring and grain of the timber is to be preserved. The shades are permanent and clear in tone, and the varnish used has been specially prepared to withstand the hard wear and non-scratching properties required for this class of finish.

"UNITED" Oil Varnish Stains dry hard in a few hours, with a high lustre, water-resisting finish which will withstand the every-day wear and tear of household traffic.

Covering Capacity. Approx. 800 square feet per gallon on a previously varnished, smooth, even surface.

Specifications

NEW WORK

Wood shall be clean and thoroughly dry before applying Oil Varnish Stain.

The first coat shall be rubbed with fine sandpaper before applying second coat. The second coat shall be similarly treated before applying final coat.

Apply Oil Varnish Stain evenly with a flat varnish brush

OLD WORK

One coat will usually be found sufficient for a previously stained or varnished surface

When used on an exterior surface exposed to the weather, durability will be increased if a good grade of varnish is applied as a finishing coat.

"UNITED" MILL WHITE

This is a high-grade material in a paste form, which only requires the addition of water to produce the necessary consistency suitable for application. It is particularly suitable for residences and workshops where a good white is desired with a high light reflection It has excellent opacity and adhesion, neither rubbing nor scaling off. It works easily under the brush without showing brush marks or laps. Spreading capacity is approximately 60 sq. ft. per lb., depending upon the surface to be coated

(Continued on next page)

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

"UNITED" KALSOMINE

This inexpensive interior wall finish is made from non-poisonous materials, which have been treated to give extra covering power

It may be mixed with hot or cold water.

When applied to a solid surface it does not peel or rub off

It gives a durable, soft and rich finish which may be recoated if necessary, but one coat is usually sufficient. It does not contain any alkali, such as lime, nor any acid, therefore it cannot affect delicate tints or colours nor destroy the brush

It does not settle in the bucket, and even after standing overnight returns to the correct consistency on simply being stirred.

It does not decay like some Kalsomines.

When applied to a prepared surface it gives a perfect finish and does not show laps

It spreads easily and works cool, and will keep in a workable condition for several days after being mixed with water

The colours may be intermixed with tints and white to produce other effects.

"UNITED" Kalsomine will cover from 300 to 500 square feet per packet

SPECIFICATION

Add just sufficient water to "UNITED" Kalsomine to convert it into a paste which may be easily stirred. Stir until free from lumps, then add enough water to convert the Kalsomine into a consistency similar to that of an oil paint when it is ready for immediate use. Should the Kalsomine set to a jell on standing, simply stir and it will return to the correct consistency without further addition of water.

APPLICATION

Close all doors and windows so as to avoid draughts and apply Kalsomine with a good brush, allowing it to flow on freely. Do not brush it out, as in the case of an oil paint. After application allow free circulation of air by opening all doors and windows.

"UNITED" STRUCTURAL STEEL PAINTS

Iron and Steel Paint differs greatly from ordinary Paints in that it is rust-inhibitive. Rust is progressive, and it is essential that this enemy of all structural steel, which is responsible for the loss of many millions of pounds yearly, should be treated with a preservative which is something more than an ordinary paint film. "UNITED" Structural Steel Paint has been formulated from pigments having excellent rust-inhibitive properties, combined in specially processed Oils, which dry to a hard yet flexible film capable of following the expansion and contraction of the metallic surface

"UNITED" Structural Steel Paints have high moisture resisting properties, thereby retarding the progressive oxidation due to rapid changing temperatures and other destructive influences

Covering Capacity.—Approx. 900 square feet per gal

SPECIFICATION 1.

NEW WORK.—The surface must be dry and free from all oil and grease. Brush down to remove all loose rust, dirt, etc.

New Galvanised Iron should be washed with a solution of Copper Sulphate, using 8 ozs. dissolved in a gallon of water.

FIRST COAT.—"UNITED" Genuine Ready-Mixed Red Lead reduced with 1-pint of Turpentine to the gallon.

SECOND COAT.—"UNITED" Structural Steel Paint reduced with 1-pint of Turpentine to the gallon.

THIRD COAT.—"UNITED" Structural Steel Paint as contained in the original package

SPECIFICATION 2.

FIRST COAT.—"UNITED" Ready-Mixed Red Lead Paint reduced in the proportion of 1-pint of Turpentine to the gallon.

SECOND OR FINISHING COAT.—"UNITED" Structural Steel Paint as contained in the original package.

OLD WORK.—Follow directions for preparation as for new work and apply one or two coats, as may be considered necessary, of "UNITED" Structural Steel Paint as contained in the original package.

"UNITED" HIGH GRADE STAINERS IN OIL

"UNITED" HIGH-GRADE STAINERS IN OIL.—These colours are composed of the highest grade chemical and natural earth pigments ground to an impalpable fineness in Genuine Refined Linseed Oil.

"UNITED" High-Grade Colours in Oil have great staining strength, and for clarity of tone are unexcelled, and combined with their easy mixing qualities they are unsurpassed for general decorative work.

"UNITED" VARNISHES

One of the most important units of the modern "UNITED" Plant is the Varnish Factory

Here under the direction of an expert, Varnishes are scientifically prepared from the purest selected materials; each varnish is thoroughly filtered and matured before being released for use or sale.

The effect of this close supervision is a range of varnishes unsurpassed for durability, brilliance and ease of working

Special requirements, which are extremely varied, are given every consideration by a fully qualified technical staff, who are at all times prepared to offer a free and continuous service

A summary of popular "UNITED" Varnishes is too lengthy to feature here; a special booklet, however, is available, containing full information and prices. We shall be pleased to forward a copy on request.

There are Distributing Agents for "United" Brand Products in every State in the Commonwealth

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RAMSAY'S ARCHITECTURAL AND ENGINEERING SPECIFICATIONS

The Authoritative Australian Specification Manual

containing over

3,000 distinct paragraphs for the building up of your office standard specifications.

25 short form specifications—suitable for descriptions of proposed work.

Many pages devoted to the actual work of assembling specification data, and the presentation of contract specifications, and much other useful matter for the specification writer.

This Manual represents two years' work in the collection, writing and editing of architectural and engineering specifications from every available source of this material in Australia.

SEE THE CLOSING PAGES OF THIS CATALOGUE FOR FURTHER INFORMATION

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Registered Trade Mark

SHERWIN-WILLIAMS COMPANY
(AUSTRALIA) LIMITED

MANUFACTURERS OF PAINTS, ENAMELS, VARNISHES, STAINS, WHITE LEAD, OPEX LACQUERS, ETC.

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S.A.A File No.

Preparation

In preparing the information contained in the following pages it has been our aim to cover as completely as possible the use and application of Sherwin Williams Finishes in the Architectural field No effort has been spared in making the data correct in every detail and the practical way in which each finish and surface are dealt should prove of assistance to the architectural profession in quickly and accurately deciding upon the right Sherwin Williams paint or varnish for the purpose in mind.

Quality

The quality of Sherwin-Williams products is unquestionable. Since its inception more than half a century ago the Company has adhered to a definite policy that makes it utterly impossible for raw materials of inferior quality to enter the works. In the manufacture of the various finishes the formulae used are the result of years of research work, both at the works and overseas, for the Company does not hesitate to send its experts abroad to seek the latest developments in a field, that, in latter years, has seen so many rapid changes and improvements.

Description

Although, no doubt, in many instances the finishes dealt with overleaf are familiar to the profession, there are a few newer lines recently added to the "S. W." range which may need explanation. Therefore, reference to the following brief descriptions will be helpful when read in conjunction with the following pages

"S.W.P." SHERWIN-WILLIAMS PAINT (Prepared) is the most durable and economical Lead, Zinc and Oil house paint on the market to-day. It costs less per job and wears longer than ordinary brands of mixed paint and is cheaper to use than straight white lead. Made in 43 shades and Gloss White, Flat White, Heavy Body White and Black.

"TEX"—a medium for securing the finest of texture finishes for interior decoration. Its use in theatres, private residences, schools, banks, large stores and hospitals is ideal, and its possibilities in the hands of an artistic decorator are limitless. "Tex may be stencilled, sprayed with bronzes or lacquers, blown with colours, stippled, tooled or glazed—furthermore, it is permanent, unaffected by moisture and is washable. Descriptive booklet on request

"WET EDGE" FLAT-TONE is offered as the ideal flat oil wall finish for the interior decoration of homes and buildings It is made on a leadless base; is quite distinct from water paints and kalsomines; is non-fading, will not show dust, is light diffusing and may be washed without injury Made in 26 pastel shades and neutral tints and white. The peculiar "Wet Edge" gives an added advantage in that drying is retarded sufficiently to allow for perfect amalgamation of each painted section without trace of lap marks

"QUICK" ENAMELS, STAINS, CLEAR, SILVER These finishes have recently been added to the Sherwin-Williams range and satisfy the demand for fast drying enamels, stains, clear and silver. They dry in approximately four hours with a porcelain-like gloss; flow evenly under the brush and level out without brush marks. "QUICK" Enamels and Stains are intermixable to secure intermediate tints. Made in—Enamels 20 shades, Black and White, Stains—7 shades and Ebony Silver and Clear Varnish

KIANDRA COLD WATER PAINT is an oil-bound cold water finish of outstanding merit. It is made up in paste form and requires only cold water for thinning. One application gives a solid covering, free from brush marks; will not peel or rub off. Kiandra is admirable for interior work (and exterior work where the surface is not exposed to the weather) May be used on wood, brick, plaster, cement, asbestos sheets or beaver board Made in 13 shades and white.

ENAMELASTIC ENAMEL answers the demand for an enamel finish that flows under the brush. Enamelastic dries in from 10 to 12 hours; is porcelain-like in appearance, and will withstand direct contact with extreme heat or cold, brine, steam and grease without loss of brilliance or colour. Ideal for factory interiors, freezing works, bakeries, breweries, hotel kitchens, bathrooms, marine use, etc. Made in 13 shades, black and white. Special undercoats for all shades.

ROCKGLOSS HOUSE PAINT—a ready-to-use, leadless house paint. Has splendid body and obliterative powers; works easily and flows out well under the brush. For work where the best results are not required. Made in 24 shades, Gloss White, Flat White and Black.

FLAT OIL STAIN gives a perfectly flat finish to woodwork, floors and furniture. Made in nine natural shades and ebony.

WAGGON AND IMPLEMENT PAINT—for painting and re-finishing pipe lines, farm machinery, waggons, implements, tools and similar surfaces Dries with a rich oil gloss; prevents rust and decay; is durable and permanent in colour Made in eight shades, black and white.

FLOORLAC—for staining and varnishing floors, woodwork and furniture in one operation. Resists continual tramping, heel-scuffing and chair scraping Ideal for hospital ward floors. Made in five natural shades.

ROGERS BRUSHING LACQUER AND OPEX INDUSTRIAL LACQUER. The uses to which these two lacquer finishes may be put in homes and buildings are so wide and embrace so many different types of finished results that it is impossible to incorporate them in such a small space. Full details regarding the nature of the lacquer finish to use and its application will be immediately given on request by our experts. Rogers Brushing Lacquer is made in 30 beautiful shades, Flat White, Gloss White, Black and Clear. Opex Industrial Lacquer is made in 21 shades, Black and White.

EGGSHELL FLAT (Velvet Finish), is a Varnish for use wherever a flat, even finish is desired It may be used either over a sizing coat or to dull a full gloss varnish. Dries in from five to six hours.

SCARNOT is a pale, tough and extremely hard wearing Varnish for furniture and interior use. It provides a sure protection against marring, scratching, and boiling water.

FINEST OAK VARNISH. A very durable, medium-coloured Varnish for all classes of interior work It dries dust free in 10 hours and hard in 24 hours.

FACTORY WHITE PAINT—a leadless and sanitary paint for use on interior walls and ceilings of Factories, Warehouses, Workshops, etc. It has almost a flat finish, covers exceptionally well and dries in from four to six hours

EBONOL is an excellent Asphaltum Black Paint for roofs, gutterings and general exterior work. It dries with a tough, glossy, weather-resisting finish.

CONCENTRATED STRUCTURAL RED can be reduced 50 per cent. with Boiled Linseed Oil! This imparts remarkable elasticity and protective power to the film and minimises the material cost

SILVERGLO. This silver paint is practically a universal utility product. It may be used in the home, in buildings, power houses, on iron roofs, and reservoirs containing volatile spirits. In connection with the latter, Silverglo reduces heat temperature by at least 13 degrees, thus effecting a considerable saving in evaporation costs.

ROOF AND BRIDGE PAINT. For use on corrugated galvanised iron roofs, barns, bridges, structural iron work, metal and tin structures and buildings of rough timber. Made in six shades and White

CONCRETE WALL FINISH—a liquid paint for use on walls of buildings, concrete chimneys, concrete surfaces, plaster, stucco walls, brickwork and terra-cotta. It fills up the pores and hardens the surface without giving the painted appearance which so many similar finishes have. Made in four shades, White and Ivory White.

PAVE-OL PATH PAINT. For use on cement, concrete or wood floors. Impervious to grease and repeated washings therefore ideal for use on garage and engine room floors and garden paths. Made in 10 shades, Black and Ivory White.

COLOUR CARDS WILL BE FORWARDED ON REQUEST

(Continued on next page)

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

Recommendations for Painting Interiors of Homes

Surface to be Treated	Materials Recommended	Technical Information			Efficiency Information
		Thinner	Proportion	Spreading Capacity per Gall	
HALLS and VESTIBULES	Tex or 'Wet Edge' Flat Tone (see below)	Cold Water	Thin to a creamy consistency		An easy working texture finish. See Tex booklet for suggested designs (Sent on request)
DRAWING, DINING, BEDROOMS and LOUNGE	'Wet Edge' Flat Tone or Tex (see above)	Raw Linseed Oil and Pure Turpentine	Supplied in liquid form. Add Thinners as per instructions on Colour Card	700/750 sq. ft.	A particularly restful eggshell flat paint that is washable. Use Flat Tone Primer on unpainted walls.
FIBRO-CEMENT, ANNEXE or BREAKFAST ROOM	Kiandra Cold Water Paint or "Wet Edge" Flat-Tone (see above)	Cold Water	Thin to creamy, easy-brushing consistency	750/850 sq. yds. per cwt.	Obtainable in white and popular shades
KITCHEN	Enamelastic Enamel	Pure Turpentine	Ready for use, but add Turpentine if necessary	600/750 sq. ft.	Enamelastic is strongly recommended for walls and kitchen equipment on account of its heat and steam-resisting qualities. Apply one or two coats Enamelastic Undercoating and finish with Enamelastic as directed
BATHROOM	Enamelastic Enamel	(see above)			
LAUNDRY	Rockgloss (Leadless Paint)	Pure Turpentine	Ready for use, but add Turpentine if necessary	700/750 sq. ft.	Rockgloss is offered in all popular shades and is quite suitable for this particular work.
	or Kiandra Cold Water Paint	(see above)	(see above)	750/850 sq. yds. per cwt.	On Concrete, Cement, or Fibro Walls use "Prymseal" (Cement Sealer) as a priming coat for Kiandra Cold Water Paint, or other succeeding coats of paint as selected.
WOODWORK, SKIRTINGS, Etc.	Flat Oil Stain and Eggshell Flat (Velvet Finish) or Finest Oak Varnish or "Quick" Enamels, Stains or Clear	Pure Turpentine if necessary	Ready for use	500/600 sq. ft.	Flat Oil Stain provides a pleasing finish, but may be treated with Flat or Gloss Varnish if desired
		Do not add Thinner	Stir vigorously if thick	600 sq. ft.	
		Pure Turpentine	Sufficient to ensure free working	600/650 sq. ft.	

(Continued on next page)

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Recommendations for Painting Interiors of Hotels, Hospitals, Factories, Etc.

Surface to be Treated	Materials Recommended	Technical Information: Thinner	Technical Information: Proportion	Technical Information: Spreading Capacity per Gall	Efficiency Information
WALLS and CEILINGS— Plaster	"Wet Edge" Flat-Tone or	Raw Linseed Oil and Pure Turpentine	Supplied in liquid form. Add Thinners as instructed on Colour Card	700/750 sq. ft.	A particularly restful, eggshell, flat oil paint that is washable. Use Flat-Tone Primer on unpainted walls.
" (walls)	Tex or	Cold Water	Thin to creamy consistency		An easy-working texture finish which does not crack or crumble. See Tex booklet for suggested designs (Sent on request)
Fibro-Cement	Kiandra Cold Water Paint	Cold Water	Thin to creamy, easy-brushing consistency	750/850 sq. yds per cwt.	Covers solidly with an intense white of great permanency. Kiandra is quite suitable for plain white ceiling work.
Factory and Warehouse Walls	Factory White	Raw Linseed Oil and Turpentine	Ready for use, but thin with equal quantities of Oil and Turps for undercoat	800 sq. ft	Factory White finishes with a permanent egg-shell gloss which guarantees maximum light-diffusion without glare
OPERATING THEATRES, BATH-ROOMS, DOORS and WOODWORK, WARDS, KITCHENS, Etc.	Enamelastic Enamel	Pure Turpentine	Sufficient Turpentine to ensure ease of working	600 675 sq. ft.	Enamelastic is a hard, steam and water resisting. Apply one or two coats Enamelastic Undercoating and finish as directed on can.
EQUIPMENT— Beds, Lockers, Fixtures, etc.	Rogers Brushing Lacquer or Opex Spraying Industrial Lacquer or Silvergo	Rogers or Opex Thinner as directed	Rogers Brushing Lacquer is ready for use, but Opex must be reduced as instructed		Rogers Brushing Lacquer is recommended where a spray plant is not available. The employment of a spray painter using Opex would prove an economy
	or "Quick" Silver and "Quick" Enamels	Ready for use, but thin with Turps. if necessary	Very little required	900/1,000 sq. ft.	An excellent rust preventive. Stir contents thoroughly and often, then pour into a shallow vessel, from which it should be used.
WOODWORK— Doors, Picture Rails, Cover Batons, etc.	Flat Oil Stain with	Ready for use	Add Turps if necessary to thin brushing consistency	500/600 sq. ft.	A pleasing, natural wood finish, which may be varnished, polished or lacquered as desired.
	Velvet Finish Varnish	Do not thin	Stir quickly	700 sq. ft.	Waterproof, will not spot white or rub to a glossy surface through wear. Represents a genuine dull rubbed effect.
Hotel Bars, Counters and Woodwork	Scarnot Varnish	Pure Turpentine if necessary	Ready for use	600 sq. ft	A very durable Varnish that is unaffected by either boiling water or alcohol
Floor Surrounds	Floorlac	Turpentine	Ready for use	500/600 sq. ft.	A hard wearing combination Stain and Varnish
PIPE LINES	Waggon and Implement Paint	Turpentine	Ready for use	600 675 sq. ft.	Supplied in popular colours suitable for pipe lines

(Continued on next page)

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Recommendations for Painting All Exterior Surfaces

Surface to be Treated	Materials Recommended	Technical Information			Efficiency Information
		Thinner	Proportion	Spreading Capacity per Gall	
GALVANISED IRON ROOFS	Concentrated Structural Red	Half each Boiled and Raw Linseed Oil	At least ½ Gall Oil to 1 Gall. Paint	1,000 sq. ft.	Remove rust and scale from old surface with wire brush. If new, apply an undercoating of Galvanised Iron Primer.
SPOUTINGS or GUTTERINGS	Roof and Bridge Paint (where colours are required)	Raw Linseed Oil	Sufficient to ensure free brushing	1,000 sq. ft.	Same instructions as above. Roof and Bridge White will reduce internal temperature considerably.
ALL EXTERIOR METAL SURFACES	Ebono. (for inside of gutterings)	None required	In cold weather, heat a little till it brushes freely	800 sq. ft.	Water and acid proof. Will effectually prevent internal rust.
BRICK or STONE WALLS	"S W P" Sherwin Williams Paint (Prepared) 52 shades	Raw Linseed Oil and Pure Turpentine	Ready for use, but thin as directed on Colour Card for 1st and 2nd coats	850 sq. ft.	Pink, White or Grey Primers are available. Satisfactory primers may be made by thinning "S W P" as instructed on Colour Card.
CONCRETE or CEMENT WALLS	Concrete Wall Finish (5 shades)	Pure Turpentine	Sufficient to ensure ease of working	700/750 sq. ft.	When treating new concrete, it is imperative to apply one coat of "Prymseal" (Cement Sealer). Do not under any circumstances add Linseed Oil.
WOODEN WALLS or TRIMMINGS, PICKET FENCES, Etc.	"S W P" Sherwin Williams Paint (Prepared)	Raw Linseed Oil and Pure Turpentine	As directed on Colour Card	850 sq. ft.	See that "S W P" is thoroughly stirred, and apply thin, oily coat for primer. For metal surfaces add a little pure turpentine for first coat.
FIBRO-CEMENT WALLS	Kiandra Cold Water Paint or Concrete Wall Finish (see above)	Cold Water and Raw Linseed Oil	Mix 1 Pint Raw Oil to 14 lbs. Paste, then thin with cold water to creamy consistency	750/850 sq. yds. per cwt.	Kiandra Cold Water Paint will give equal service to any similar preparation when Linseed Oil is added as directed.
CONCRETE and CEMENT PATHS	Pave-Ol Path Paint	Pure Turpentine only	Sufficient to ensure ease of working	450 sq. ft.	May be used on wooden verandah floors as well as concrete. Is oil-proof and water-resisting.
METAL FENCES, GATES, Etc.	Silverglo or "S W P" (see above)	Turpentine	Very little required	900/1,000 sq. ft.	Silverglo is an excellent anti-corrosive agent and is luminous to a degree. Keep contents often stirred and apply from a shallow vessel.

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MAJOR BROS. & CO. LIMITED

MANUFACTURERS OF PAINTS, COLOURS, STAINS AND VARNISHES.

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CORRESPONDENCE, BOX 15, P.O., BURWOOD, SYDNEY.

"Majora"
Water Paint
Mil White
Pure Mixed Paint

INTERSTATE AGENTS:

VICTORIA: N. Macleod & Co. Pty. Ltd., 403 Lonsdale Street, MELBOURNE

SOUTH AUSTRALIA: P. J. A. Lawrence, Cranbrook Chambers, Bentham Street, ADELAIDE

WESTERN AUSTRALIA: Melbourne Steamship Co. Ltd., 9 Mouatt Street, FREMANTLE

SOUTH QUEENSLAND: Jas. D. Sloan & Co., 95 Adelaide Street, BRISBANE

NORTH QUEENSLAND: Burns, Philp & Co. Ltd., Townsville, Cairns, Bowen.

SOUTHERN TASMANIA: Chas. Davis Ltd., 64 Elizabeth Street, HOBART

NORTHERN TASMANIA: J. R. Green Pty. Ltd., Charles Street, LAUNCESTON

Achievement

MAJOR BROS. & CO. LTD. cannot be denied the remarkable progress of recent years, and the tremendous success attained in creating the public demand for their many products which are now firmly established on the market. Since the disastrous fire, which gutted a large portion of the works, new buildings of the most modern design have been erected, thereby securing the highest degree of efficiency possible, whilst the plant has been replaced with the latest type of machinery, selected from abroad by paint technicians and expert engineers. The up-to-date method of manufacturing, and the lay-out of the works, is equally as modern and efficient as any other Paint Colour and Varnish Factory in any part of the world.

Experience

THE AUSTRALIAN PAINT & COMPOSITIONS CO. LTD., in association with The International Paint & Compositions Co. Ltd., London (founded and established Newcastle-on-Tyne, 1881), who are associated with factories in various parts of the world, acquired Major Bros. & Co. Ltd. last year, and as the manufacture is under the direct supervision of one of the chief technical experts of The International Paint & Compositions Co. Ltd., it can be seen that not only are "MAJORA" products now manufactured in one of the most modern factories in the world, but under expert supervision backed by experience extending over half a century.

Products

We manufacture a very comprehensive range of Paints, Colours, Water Paints, Stains and Varnishes—that we keep ahead of the times has been evidenced by the success of new lines introduced by us during the last twelve months. In addition, the formula of the various lines is constantly under review with a view to, if possible, improving the quality, and where after tests changes have been found advantageous they have been made. This ensures that the standard of "MAJORA" products will always be maintained.

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

"MAJORA" MILL WHITE

We are the originators and pioneers of this famous line. Although often imitated, it has never been equalled. It is hygienic, increases light, has tremendous spreading powers, is easy to apply, dries free from brush marks, and splendid results can be obtained with one coat. It is supplied in paste form, and only requires the addition of cold water thinned to a working consistency for average surfaces. Recommended for brick, stone, cement, plaster, beaver boards and composition sheetings For interior decoration—public buildings, hospitals, homes, factories, etc. If required for outside use the directions are as follows:—

To every 7 lbs. of Paste add 1 pint Raw Oil, and stir till uniform, then thin with water to working consistency.

MILL WHITE is an efficient primer for new cement, being an excellent foundation for paint.

"MAJORA" WATER PAINT (IN PASTE FORM)

This is "Majora" MILL WHITE in tints. Prepared in 32 artistic shades and used for interior decoration on walls of cement, plaster, brick, stone or composition sheeting.

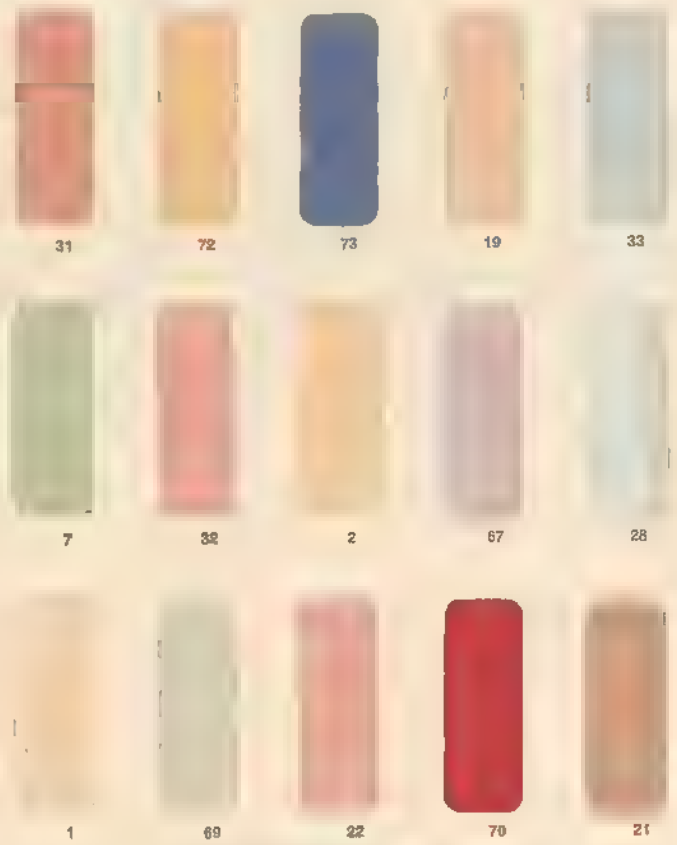
"Majora" Water Paints produce a smooth velvet finish, working out practically cheaper than Kalsomine.

"MAJORA" MILL WHITE

Gives a smooth velvety finish, intensely white, with one coat.

Only requires the addition of cold water.

Covers 800 sq. yards per cwt.



"MAJORA" Water Paint

Available in 32 artistic shades.

Entirely suitable for every kind of wall decoration in cottage, office or mansion.

Over 500,000 satisfied users.

"Ceilinite"

THE PERFECT WHITE FOR CEILINGS.

This material has been specially formulated as a result of considerable research work, and now overcomes the problems of painting ceilings with a suitable Water Paint that will definitely adhere to the surface.

"Ceilinite" covers well, gives a dull velvety finish, AND WILL NOT peel nor scale off.

It is for ceiling work and cornices only—"Majora" Mill White should always be used on walls.

"Ceiltex"

For the ceilings of Bath-rooms and Kitchens we would recommend that our "Ceiltex" be used as it is specially prepared to withstand the vapour rising from steam which causes the ceilings to frequently become damp. This special paint for ceilings of Bath-rooms and Kitchens has been specially manufactured for this purpose, and can be recommended as the most suitable on the market.

"Sizol"

"SIZOL" (ready for use) is an oil wall size for the priming of walls where excessive suction occurs, or treatment of old surfaces where the material is loose. "SIZOL" gives a solid surface over which "MAJORA" WATER PAINTS and "MAJORA" MILL WHITE work smoothly, and makes it possible to obtain a finish in one coat. "SIZOL," when properly applied, does not completely stop suction (that is not desirable), but it does uniform the suction leaving sufficient absorption or porosity to enable the first coat of paint to penetrate enough to gain good anchorage and adhesion to the surface

Directions for Use

FOR INSIDE WORK Wash off all old Paint and remove any greasy spots from the wall or surface to be treated. Thin down the "MAJORA" WATER PAINT gradually with cold water to the consistency of cream—approximately a quart of water to each 7 lbs. of paint. Avoid over-thinning, as this may cause it to rub off.

"MAJORA" WATER PAINT is best applied with a four or five-inch flat wall brush. One coat produces a good finish, but where the surface has been badly stained or greasy, or where a very high-class finish is desired, a further coat is recommended.

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

"MAJORA" PURE MIXED PAINTS

801 802

are manufactured by the aid of specially-developed heavy grinding machinery, with carefully-selected, pure materials which being scientifically controlled in their combinations, yield a product that covers and looks better, works easier and has a finer gloss than is possible with hand-mixed paints

"Majora" Pure Mixed Paints retain their colour and lustre longer than most other paints—obtainable in 24 modern shades—for indoor and outside use

Directions for Use:

Stir the contents of the tin thoroughly until of a uniform consistency. If too thick add only sufficient Genuine Turpentine (not Mineral Turps) to make the paint work freely under the brush. For priming or first coat work, use white or pale tints as stone colours, adding approximately half-pint of Genuine Turpentine (not Mineral Turps) to each one gallon of paint. For finishing coat no additions are necessary. To ensure best results it is advisable to use our special undercoatings.

803 804

805 806 807 808 809 810 812 813

814 815 816 817 818 819 820 821

ALSO BLACK AND WHITE

"Majora" Brick Liquid

For waterproofing and preserving brick, stone, or cement exteriors "MAJORA" Brick Liquid is entirely absorbed by the wall which it penetrates and is retained without being affected by climatic conditions It forms an indestructable and insoluble barrier, preventing ingress of damp or rain without disfiguring

the surface It is colourless and effectively prevents the fretting and crumbling of stonework on exposed positions. TWO COATS OF "MAJORA" BRICK LIQUID are recommended, and the second coat may be applied almost immediately over the first coat.

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

"ARTONA" FLAT OIL PAINT

For interior walls, metal ceilings and general purposes. Dries with a dull velvet finish and is easy to apply. It is sanitary, washable, and non-absorbent, and imparts to all classes of work a highly artistic and permanent finish It is made in a variety of soft, permanent shades, and makes an ideal surface for oil colour decoration and stenciling in any artistic designs. "Artona" may be applied to either smooth or rough plaster, fibre board, metal ceilings and interior woodwork. "Artona" produces a soft, beautiful finish which is very restful to the eye, and is, therefore, recommended for hospitals, schools, theatres, public buildings and offices, as well as for cottages or mansions

DIRECTIONS FOR USE.

First stir "ARTONA" until the contents are of a uniform consistency. See the walls and other surfaces are thoroughly dry. Cracks and uneven places should be filled with Plaster of Paris and allowed to dry. Cover the patched places with a thin coat of "ARTONA" first. If paint is too thick, add only just sufficient genuine Turpentine to make it work easily. Apply with a good four-inch flat wall brush Flow "ARTONA" on like varnish; do not brush out too thinly, as it flows out alone to a smooth finish. Give new walls a coat of "ARTONA" preparatory liquid, which prevents suction, enabling the paint to work easier and dry hard.

FOR OLD WALLS. If the walls have been previously coated with Kalsomine, remove the old coating and apply a coat of preparatory liquid; finish with "ARTONA" in the usual way.

FOR WOODWORK. Cover knots with shellac knotting before applying "ARTONA"

FOR METAL CEILINGS. Thin slightly with Turpentine Two coats produce a perfect white plaster finish, which will not show rust stains.

FOR ENAMEL UNDERCOATING. Apply "ARTONA" Flat Oil Paint White direct from the tin without thinning.

Allow 48 hours for drying between each coat. One coat is sufficient for ordinary purposes. Two coats produce the highest class of decoration obtainable. See colour card for standard shades.

"MAJORA" ANTI-CEMENT OIL PAINT

The architectural beauty of modern concrete buildings is greatly enhanced by colour treatment. After a series of chemical tests, also practical experiments extending over a long period, this line has been perfected. It is resistant to acids and alkalies, in addition to being damp and waterproof. It dries as hard as stone and forms a perfect protection against disintegrating influences. Suitable for use on concrete cement, stucco, plaster, stone monier pipe, cement slabs, iron and brick surfaces

For Interior or Exterior Use.—In all cases, to ensure success on new cement, give the surface one good coat of special Priming Liquid (cement neutraliser), which is easily and quickly applied.

"MAJORA" VARNISHES

"MAJORA" VARNISHES are guaranteed manufactured by English processes, and from carefully selected Natural Fossil Gums, compounded with specially reinforced Linseed Oil and Turpentine. "Majora" Varnishes are carefully matured before despatch. There is a "Majora" Varnish for every purpose.

"MAJORA" BEST PALE EXTERIOR COPAL. A very pale Varnish for exterior use

"IN-OR-EX." Suitable for interior or exterior use, will stand hot water, dries in four hours

"MAJORA" ALL PURPOSE VARNISH. May be adopted for all general interior and exterior uses. Weather and water resisting

"MAJORA" FINEST MARINE COPAL VARNISH Does not turn white; recommended for property exposed to sea air.

"MAJORA" EXTRA PALE TEREBINE. A very powerful drier; does not discolour white or delicate shades

"MAJORA" EXTRA HARD CHURCH OAK VARNISH. Dries extremely hard. Suitable for Church seats, public halls, restaurants, etc.

Although we manufacture a full range of Varnishes we have only mentioned those having the largest demand as the variety manufactured by us, including Marine and Industrial Varnishes, exceeds 100.

"MAJORA" STAINERS & COLOURS IN OIL

"Majora" Stainers are uniform in colour and staining strength, and, owing to their remarkable strength, they are very economical in use. "Majora" Stainers are manufactured from specially selected materials, ensuring exceptionally strong colours with clean, permanent shades

OTHER "MAJORA" PRODUCTS

There is a "MAJORA" product for every surface, and each line is manufactured to a standard of quality that gives the desired results that are uniform and dependable

"MAJORA" products are too numerous to itemise in the limited space available in this book, but a few that may be of interest are as follows

"SILAGEN" ALUMINIUM ENAMEL PAINT For hand rails, pipes, etc

"MAJORA" PAVING PAINT For cement paths, porches and pavements, etc

"GALVO" NON-POISONOUS ROOF PAINT. For preserving and decorating galvanised iron roofs and all metal surfaces

"MAJORA" DECORATORS' WHITE. A heavy bodied white specially prepared for Decorators' use.

"WHITEX" IN OIL, in paste form. A Titanium Zinc in oil

"MAJORA" FLOOR VARNISH STAIN. Extra hard drying combined varnish stain for floors, furniture, etc

"ARTONA" WHITE ENAMEL. Suitable for all purposes, interior and exterior.

"MAJORA" SPEED ENAMELS. Dry in one hour For interior use—tables, chairs, fixtures, etc

SERVICE

"MAJORA" AGENTS are established in all States, and we solicit your enquiry for colour cards and full information

Representatives with a sound, practical knowledge will be only too pleased to call personally and discuss your painting problems.

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

SEVAC'
TZO'
'EV-A DRY"
BRICLAC'

STERLING VARNISH COMPANY

Works and Offices
HUNTLEY STREET, ALEXANDRIA, SYDNEY. Tel. Mascot 338-390

Victorian Branch—237 Queen St., Melbourne. Tel. Central 8664.
South Australian Branch—91a Currie Street, Adelaide. Tel. Central 74.
Queensland Agents—A. C. Baker & Co. Ltd., 104 Mary Street Brisbane
West Australian Agents—Raphaels Ltd., 891 Hay Street, Perth.
New Zealand Agent—Mr. J. J. Higgs, 104 Ellice Street, Wellington

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S.A.A. File No.

Products

The Company's many activities cover a range of products of particular interest to architects. These products include Sterling Home Paints "TZO" (Titanium Zinc Oxide), "Sevac" Brushing and Spraying Lacquers, "Four Hour" Enamels, Varnishes Stains, Cement Paints, Mill White "Primol" (priming liquid), "Weatherol," "Ev-a-dry" and "Briclac," the last three being damp-proofing liquids for specific purposes.

The Company

The name of Sterling Varnish is not only well-known in the Commonwealth of Australia, but the establishment of their products in the severely competitive markets of India and New Zealand is proof of their intrinsic value. The capital and labour employed by this company is wholly Australian.

FOREWORD TO DESCRIPTIVE DATA AND SPECIFICATIONS

It is desired to point out that there has been a tendency to follow precedent in the matter of paint formulation and application. Although, no doubt, these were the best available at the time they were arranged and used, they have neither provided for the changes that have occurred in modern building materials or the time factors allowed between construction and painting, and last, but not least, the great progress made by the paint industry by the introduction of new pigments and mediums capable of modifying and eliminating the defects that older paint mixings so frequently revealed.

The cost of painting experiments undertaken by various Societies of Research in order to achieve these improvements is considerable, and beyond the range of the commercial painter, but *the results* are available for those who care to enquire. It is therefore the aim of progressive manufacturers to be guided by the results in the formulation of products; but it is only by interesting the architect in these latest developments in painting methods and thus creating a demand for the improved products and methods of use that improvement in general painting work may be effected.

In the accompanying index for painting, etc., and the description of products and specifications it has been the aim to give a number of alternative treatments where they will be similarly usable. The descriptive data and specifications have been divided into four main sections, namely: Preservatives and Anti-Damp Treatments, Exterior Painting, etc., Interior Painting, etc., and "Sevac" Pyroxylin Lacquers. Where there is a possibility that one material or application described in one section is equally as suitable in another, cross references to that effect will be noted in the specifications. The reader is recommended to refer to the index before proceeding to locate the descriptive data or specification required for a particular purpose.

We trust that the information given will be of value to the architectural profession in devising complete specifications to meet the varying conditions encountered.

SECTION 1

PRESERVATIVES AND ANTI-DAMP TREATMENTS

Brickwork, Concrete, Stone and Stucco

The types of preparations usually employed for the damp-proofing treatments of the above surfaces generally consist of (1) a highly penetrating fluid designed to leave the appearance of the surface unchanged, or (2) a varnish-like type that leaves a somewhat glazed effect.

The first type of which Sterling "Ev-a-dry" is an example is to be recommended for exceptional cases of dampness.

The second type of which Sterling "Briclac" is an illustration is most valuable also as an alkali resistant medium where the surface is to be painted afterwards.

Both preparations have a strong binding effect upon plaster and mortar.

"Ev-a-dry" is a colourless, deep penetrating damp-proofing liquid used to arrest dampness in buildings already erected and to reduce the efflorescence that generally accompanies moisture penetration. It penetrates any concrete, stone, brick or stucco surface, adhering to the linings of small cavities, thoroughly filling the voids and filling the minute pin holes. It assures a complete damp-proofed building. It is positively alkali resistant, is not affected by temperature changes and is adaptable at all times to the physical changes of the material treated.

As "Ev-a-dry" is colourless and chemically penetrates and binds with the wall surface in an integral manner, the natural colour and texture of the walls and normal appearance of the building is retained.

"Ev-a-dry" prevents the possibility of efflorescence, which not only causes unsightly buildings, but is the first stage that leads to the corrosion and spalling and the subsequent deterioration of brickwork and masonry.

"Briclac" is a fuller-bodied liquid than "Ev-a-dry" and is designed to stop the suction of brickwork and porous masonry and provide an adhesive alkali resistant, but, as it has less penetration and darkens brickwork slightly, it is more suitable as an economical priming coat, or if a glaze is required for brickwork. When used as a priming coat it is preferable to painting directly with alkali resistant pigmented paints. "Briclac" may be used with success on other surfaces such as concrete, stone, and stucco whenever a slightly dark glaze is not considered objectionable, or when it is the intention to follow up the damp-proofing treatment by painting.

(Continued on next page)

(NOTE: The exclusion of pages 255 to 258 does not in any way disturb the sequence of these Catalogue pages. Ed.)

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INDEX FOR PAINTING, VARNISHING, ENAMELLING, LACQUERING, ETC.

SECTION I.—PRESERVATIVES AND ANTI-DAMP TREATMENTS

Kind of Surface and Finish Desired	Product to Use	Description S.V. Title No.	Specification Number
Exterior Concrete and Stucco	'Ev-a-dry' 'Briclac'		
Exterior Brickwork	"Ev-a-dry"	1	1
	Briclac"	1	2
Exterior Woodwork	"Weatherol"	3	3
Exterior Metalwork	"Fish-O-Lac"	3	4
Structural Steel, G. I. Surfaces	"Fish-O-Lac"	3	4
Plaster Walls	'Sevac" Brushing and Spraying Lacquers	3	5, 6
Fibro Cement	"Sevac" Brushing and Spraying Lacquers	3	5, 6

SECTION II.—EXTERIOR PAINTING, VARNISHING, ENAMELLING, ETC.

Kind of Surface and Finish Desired	Product to Use	Description S.V. Title No.	Specification Number
Concrete, Stone and Stucco— Priming	Sterling Cement Paint	1	[illegible]
Painting	Sterling Mill White	4	9
Pavements	Sterling Paving Paints	4	10
Brickwork— Priming	[illegible]	1	
Painting	Sterling Cement Paints	1	[illegible]
	Sterling Mill White	[illegible]	11
	Sterling Home Paints	[illegible]	1
	"T.Z.O." (Titanium Zinc Oxide)	[illegible]	12
Exterior Woodwork— Priming	Sterling Priming Paints	4, 5	—
	"Silverglos" Aluminium Paint	4, 5	—
	"Primol"	4, 5	—
Painting	Sterling Home Paint	5	15, 17
	T.Z.O." (Titanium Zinc Oxide)	5	15, 17
	"Savox" (Paste white)	5	16
Staining	Sterling Exterior Stains	6	18
Stained and Varnished Finish	Sterling Exterior Varnishes	6	19
Enamelling	"Durable" Enamels	6	20
Metallic and Galvanised Surfaces and Structural Steel— Priming	"Fish-O-Lac"	3, 6	—
Painting	'Roofrite'	6	21, 22
	Structural Steel Paint	6	22
	'Silverglos" Aluminium Paints	6	23

SECTION III.—INTERIOR PAINTING, STAINING, VARNISHING, ENAMELLING

Kind of Surface and Finish Desired	Product to Use	Description S.V. Title No.	Specification Number
Woodwork Priming and Preparation of Surfaces	'Sevac" Paste Fillers and "Primol"	6	
Painting	"Hometone" Flat Paints	7	25
	Sterling Home Paints	8	32
	T.Z.O." (Titanium Zinc Oxide	[illegible]	[illegible]
Enamelling	"Four Hour" Enamels	7	28
Staining	Sterling Interior Stains	8	37
Stained and Varnished Finishes	Sterling Interior Varnishes	8	38, 39, 40

SECTION III.—(continued)

Kind of Surface and Finish Desired	Product to Use	Description S.V. Title No.	Specification Number
Wood Floors— Staining	Sterling Floor Stain		11
Stained and Varnished Finish	Sterling Floor Varnish	[illegible]	[illegible]
Plaster— Priming and Preparation of Surfaces	[illegible]	7	
Painting	'Hometone' Flat Paint	7	[illegible]
	Sterling Water Paints	[illegible]	
	Sterling Mill White	8	
	Sterling Home Paint	8	
	"T.Z.O." (Titanium Zinc Oxide)	[illegible]	[illegible]
Enamelling	"Four Hour' Enamels		
Fibro Cement	See under 'Plaster'		
Metal Work— Priming Treatment	See page 7	7	
Painting	'Hometone' Flat Paints	7	
	Sterling Home Paint		
	and Home Paint	8	36
	'Silverglos Aluminium Paint	8	43
[illegible]	Four Hour" Enamels	7	29
Radiators and Pipes— Painting	[illegible]		
Finishing	[illegible]		

SECTION IV.—"SEVAC" PYROXYLIN LACQUERS

Kind of Surface and Finish Desired	Product to Use	Description S.V. Title No.	Specification Number
Woodwork— Clear Lacquer Finishes High Gloss	'Sevac' Brushing and Spraying Lacquers	9	-
Semi Flat	"Sevac' Brushing and Spraying Lacquers	9	44
Flat	"Sevac" Brushing and Spraying Lacquers	9	[illegible]
Coloured	"Sevac" Brushing and Spraying Lacquers or "Rex Lacs"	9	46, 47
Plaster— Coloured Lacquer	"Sevac" Brushing and Spraying Lacquers or "Rex Lacs"	9	49, 5, 6
Metalwork	"Sevac' Brushing and Spraying Lacquers or "Rex Lacs'	9	
Bronze Finishes (generally)	'Sevac" Bronze Lacquers	9	50
Burnished Metal Fittings	'Sevac' Bronze Lacquers		

(Continued on next page)

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SECTION I.—PRESERVATIVES AND ANTI-DAMP TREATMENTS—(*continued*)

Specification No. 1

Damp-Proofing, Concrete, Stone, Brick or Stucco Walls.

(USING A COLOURLESS, PENETRATING LIQUID).

The surfaces to be treated shall receive one thorough absorbing treatment of Sterling "Ev-a-dry," after which point up with cement all wa ls where necessary and fill all cracks and voids. After pointing has thoroughly dried and set, and the first application of 'Ev-a-dry" is completely dried, the surfaces shall receive two further coats of "Ev-a-dry," applying the material berally with brush or spray and allowing the surfaces to absorb as much as possible.

At least four hours shall be allowed to elapse between each of the three coats. No material shall be applied unless the surfaces are absolutely dry (warm weather is the best time); nor in damp, foggy weather, nor directly after rainfall, non to new concrete, plaster or stucco.

NOTES.—Efflorescence stains that are present on the surfaces can be removed with a wash of sulphate of zinc, 4lbs. dissolved in 1 gallon of water, before the application of "Ev-a-dry."

Grease and oil can be removed with a wash of benzine.

Keep "Ev-a-dry" away from naked flame.

Specification No. 2

Damp-Proofing Concrete, Stone, Brickwork.

(PREPARATORY TO PAINTING OR WHERE A SLIGHT GLAZE IS REQUIRED)

Remove al dust, d rt and loose particles from the surfaces and point up all joints, cracks, etc., where necessary. Apply (2) (3) good coats of Sterling "Briclac" to the surfaces to be treated, allowing 8 hours to elapse between the application of each coat.

No material shall be app ied unless the surfaces are perfectly dry; nor in damp, foggy weather, nor directly after rainfall, nor to new concrete, plaster or stucco

NOTE.—See notes to Specification No. 1, re removing exist ing sta ns and grease

Woodwork

Exposed unpainted woodwork can be effectively preserved by dressing with Sterling 'Weathero.' "Weatherol' is composed of a blend of weather-resisting oils, specially treated so as to ensure a protective film against the elements to which the woodwork is exposed.

Weatherol" is colourless, but enriches the appearance of woodwork It withstands the action of sea air and retains its lustrous finish under exposure to varying climatic conditions.

'Weatherol' is excellent for renewing paint work which looks dull It is easy to use and can be applied over all colours

Specification No. 3

Preservation of Exterior Woodwork.

A l grease and dust shall be carefully removed from the surfaces to be treated Apply two coats of Sterling "Weatherol," brushing each coat out freely and evenly and allow eight hours to elapse between the application of each coat.

No material shall be applied to damp or green timber.

Structural Steel and Exterior Metal Work

Sterling "Fish-O-Lac" is a specially prepared fish oil and entirely different in action to ordinary anti-corrosive paints and oils, because when it is dry it has a *permanently plastic finish*. It always has a slight tack, but this does not interfere with paint, enamel or lacquer being used subsequently. "Fish-O-Lac" penetrates rust, *binds* it and prevents the extension of rusting.

Other oils do not penetrate like "Fish-O-Lac"; consequently they dry on top and rusting proceeds underneath until the protective film ultimately scales off by the growth of rust beneath the film. "Fish O-Lac," therefore, binds rust, and localises it by holding it with an insulating medium which penetrates to the seat of corrosion As rust is the after effect and not the cause of corrosion, "Fish-O-Lac" thus *converts* rust into a protective coating. "Fish-O-Lac" is a fixed oil and non-volatile like mineral oils, and therefore stays when it is applied.

Nothing but sand blasting will give a perfectly clean surface on rusty iron. This treatment is necessary before ordinary anti-corrosive paints and oils are used—a process often impossible as the cost is sometimes prohibitive

USES.—"Fish-O-Lac" is specially made to check rust on steel construct on, mach nery, farm mplements, mar ne engines and galvanised iron. It is invaluable as a priming coat on galvanised roofing before painting. Clear in colour

Specification No. 4

Preservation of Structural Steel and Exterior Metal Work

'Fish-O-Lac" may be applied by d pping, brushing, spraying or even wiping on.

'Fish-O Lac" is rather heavy, and for the sake of convenient application, it may be diluted with up to 20 per cent. of m neral turpent ne for dipping and brushing, or diluted with 30-40 per cent. of petrol for spraying purposes.

"FISH-O-LAC" PAINT.—If desired to convert "Fish-O-Lac" into a paint, it may be mixed with a pigment like Spanish Red Oxide in the proportion of 4 lbs. to the gallon For better dispersion, it is preferable to mix it with the oxide ground in linseed oil in paste form. The small amount of linseed oil introduced this way does not affect the preservative action of 'Fish-O-Lac."

This makes an effective one coat paint for roofs.

For sides of buildings (galvanised wall siding, etc.), the benefits of "Fish-O-Lac" may be obtained without the attendant tackiness by priming with "Fish-O-Lac" and finishing next day with Sterling Red Roof Paint. The result is a paint that is dry to the touch, yet remains permanently plastic.

LOOSE RUST.—All iron machinery or galvanised iron, if extremely rusty, should first be wire brushed to remove loose rust

Plaster and Fibro-Cement

A few years ago the interesting discovery was made by Sterling Varnish Co. that by making certain modifications in Nitro-Cellulose Lacquers they would adhere to and dry upon wet bricks, cement, plaster or even wet paper.

To do this, no previous treatment is required other than wiping off the superficial water with a dry cloth The film, which dries within 30 minutes even in the most adverse conditions is then, for all practical purposes, impervious to water In this manner wet plaster may be first treated with lacquer and afterwards painted or kalsomined in the ordinary way. There being no saponifiable matter in lacquer it naturally follows that the finishing coats of paint are immune from the destructive influences in cement and plaster.

New work of wet cement, fibrous, etc., should be treated with "Sevac" Brushing Lacquer before being painted. Their lime combating powers enable the work to be proceeded with at once.

Chronic damp patches in walls cannot be cured by repainting in the ordinary way with oil paints, as even damp-resisting solutions required a dry wall for their application in the first instance. "Sevac" Brushing Lacquers can be used to obliterate these patches by employing the methods noted in the specifications below.

Specification No. 5

Treating New Wet Plaster and Fibrous Surfaces.

'Sevac" Brushing Lacquers, painted over absorbent surfaces, give the effect of flat paints, with the added advantages of being fully bound and fast to water and lime, and being able to withstand rubbing with cleansers, etc. Their durability on exterior fibro is excellent.

OIL PAINT FINISH.—If, however, it is desired to finish with oil paints, a lacquer of similar colour to the paint, affords a perfect lime-resisting and preservative base for the paint to follow. The lacquer takes the place of the oil priming paint. It enables the second coat to be applied without delay—a great advantage in emergency work.

APPLICATION.—Before applying "Sevac" Brushing Lacquer, brush all work clean and rub dry wet surfaces. To spray, add 30 per cent. of "Sevac" Brushing Thinners to the lacquer When brushing, use a large soft brush. Brushing is recommended for very wet surfaces.

Avoid strong draughts while working

Specification No. 6

Obliterating Chronic Damp Patches on Plaster Walls.

Completely scrape and clean away all existing paint, and thoroughly clean the surface with pumice powder and benzine to remove all traces of greasy preparations. Wash off the kalsomine on damp patches of kalsomined walls. Apply "Sevac" Brushing Lacquer to the surface with brush or spray, and when dry, paint as follows—

OIL PAINTS.—If possible, procure the original colour of paint used, and darken slightly with a little Burnt Umber in oil if the old paint has shown pronounced darkening. At the same time, the new patching paint, when applied, should be slightly lighter than the main body This allows for rapid darkening of the new paint Two coats of oil paint are generally advisable.

—KALSOMINES are difficult to tint accurately. The safest plan is to obtain some of the original colour used and rekalsomine the whole wall surface. Two coats of white or cream kalsomine are advisable One coat is sufficient for most other colours.

(*Continued on next page*)

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SECTION II.

EXTERIOR PAINTING, VARNISHING AND ENAMELLING

Concrete, Stone, Stucco

CEMENT PAINTS. Sterling Cement Paints are flat drying liquid paints for painting cement, concrete, stone, brick, stucco, and plaster; both exterior and interior. In residence work they are very effective. The harshness of raw stucco is mellowed to a warm velvety matt finish, crumbling is retarded, and the dangers of dampness in the wall, and the collection of dirt and rain streaks are minimised

Sterling Cement Paints are alkali resistant and provide a satisfactory damp proofing treatment, but it will be appreciated, however, that no pigmented paint can be made to combine in one operation the effective treatment obtained by the preliminary soaking with a damp-proofing anti-alkali liquid and subsequent painting as recommended in Section 1 Therefore, in painting concrete and stucco we urge this preliminary treatment. Concrete and stucco that is sufficiently dry should receive a priming of "Briclac" before painting; new concrete is best treated with a wash of zinc sulphate, 2 lbs. per gallon of water, to neutralise the excess alkali Sterling Cement Paints are obtainable in a wide range of colours.

Specification No. 7

Cement Paints on New Concrete and Stucco.

Apply a wash of zinc sulphate, 2 lbs. per gallon of water, and allow 8 hours for drying.

Apply 2 coats of Sterling Cement Paints of a selected shade and allow 12 hours to elapse between the application of each coat.

Specification No. 8

Cement Paints on Dry or Aged (approximately 12 Months Old) Concrete and Stucco.

See Specification No. 2 for waterproof priming treatment.

Apply 2 coats of Sterling Cement Paint of a selected shade and allow 12 hours to elapse between the application of each coat.

MILL WHITE.—Sterling Mill White is very effective as a low-priced sanitary finish for all kinds of exterior work. It is very finely milled, and when prepared for use it binds to the surface to which it is applied without scaling and chipping off when dry

Specification No. 9

Mill White on Exterior Concrete, Stucco or Plaster.

Before adding water stir at least 1 pint of linseed oil into every 28 lbs. of Sterling Mill White, and then thin with water to a creamy consistency Apply 2 coats, allowing the first to thoroughly dry before applying the second coat.

All concrete stucco surfaces must be thoroughly dry before the application of Mill White.

STERLING PAVING PAINTS. — The properties of Sterling Paving Paints are as follows:—Strong staining and permanent colours, finely ground in a rather highly fluid medium to obtain great penetration. Both pigments and medium are resistant to the alkali in cement. The colours cannot fade in the light. The water resistant property of the paint is excellent

Specification No. 10

Pavement Painting.

Apply 2 coats of Sterling Paving Paint of selected colour. Apply the first coat liberally to ensure penetration and to seal the surface. Apply the second coat 8 hours or more after the application of the first coat. The work must be thoroughly dry and clean before application.

NOTE.—The second coat gives a distinctive gloss and improves the appearance.

New concrete should be treated with a wash of zinc sulphate, 2 lbs. per gallon of water, before the application of the paving paint Allow 8 hours for drying.

Brickwork

OIL PAINT FINISH. Provided a suitable priming treatment is applied, oil paints provide an excellent finish to brickwork Sterling "Briclac," as already mentioned in Section 1, forms a waterproof priming and stops the suction action on paint that is caused by the porosity of brickwork.

The respective merits of Sterling Home Paint, a prepared paint, and "T.Z.O. (Titanium Zinc Oxide) which gives a pure, unfading white, are described under the heading of "Wood work," S. V. page 5 in this section. Both these paints will give the same satisfaction on a correctly primed brick surface as they do on woodwork.

Specification No. 11

Oil Paints on Brickwork.

See Specification No. 2 for damp-proof priming and the prevention of brickwork suction.

TWO COAT WORK.—It is an advantage to thin the first coat of Sterling Home Paint with 10 per cent. of turpentine to assist penetration and ease of working.

The addition of 5 per cent raw linseed oil is a benefit in the finishing coat.

THREE COAT WORK.—For white and very light colours, 3 coats are required

FIRST AND SECOND COATS.—Thinned with 10 per cent. of turpentine.

FINISHING COAT.—Add 5 per cent of raw linseed oil.

Specification No. 12

Titanium Zinc Oxide Paints on Brickwork.

See Specification No. 2 for damp-proof priming and the prevention of brickwork suction.

"T.Z.O." Paint (white) requires 3 coats.

See Three-Coat Work under Specification No 11.

CEMENT PAINTS [illegible] suitable for application on brickwork as they are for concrete and stucco surfaces. 'Briclac, once again, is recommended as a suitable priming to ensure a complete damp proofing surface

Specification No. 13

Cement Paints on Brickwork.

See Specification No 8.

MILL WHITE Sterling Mill White is a good economical white finish to brickwork

Specification No. 14

Mill White on Brickwork.

See Specificaton No. 9.

Woodwork

PRIMING.—There was a tendency at one time to overlook the importance of priming coats, when, as a matter of fact, successful painting is absolutely dependent upon the correct choice of primer, provided the finishing paint is of good quality. The traditional method of applying paint is to first paint a thin penetrating priming coat. Where the nature of the wood is such that it will not interfere with the final oxidisation of the oil it acts as an effective sealer, but the "burning off" of "old" blistered paint-work has revealed the fact that liquid oil has been held for many years under a skin of paint. Certain types of wood—particularly cedar and redwood—are noted for their softening action on paint, while resinous patches in oregon inhibit drying. This softening action is generally a preliminary to blistering when the warmth of the sun draws the vapours from the ducts of the wood to the surface The reason for blistering is thus apparent, and will convince the observer that linseed oil or thin linseed oil paint is not a suitable first coating for woods of these descriptions.

STERLING PRIMING TREATMENTS.

"Silverglos."—Aluminium powder in a suitable varnish medium when used as a priming coat for oil paints has in all cases given a remarkable increase in life to paint, and eliminated blistering and softening troubles The flaky particles of the metal have the property of leafing on the surface of the varnish medium, forming an impenetrable film. Aluminium absolutely resists ultra violet rays. It is a sealer, preventing the warping of woodwork caused by alternate wetting and drying out

Aluminium is a remarkably permanent metal It, however, oxidises slowly in moist atmospheres, but used as a primer under paintwork, it is definitely protected against oxidisation, and is therefore able to exert its valuable preservative properties to the fullest degree

The extraordinary spreading qualities of an aluminium paint, such as Sterling 'Silverglos" neutralises its apparent high price. The obliterating power of 1 coat is equal at least to 3 coats of white lead

(Continued on next page)

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

SECTION II.—EXTERIOR PAINTING, VARNISHING AND ENAMELLING (*continued*)

Sterling Priming Paints.—Varnish primers (without aluminium) or compound oil and varnish (pigmented) primers have also given superior results to the old-fashioned thin oil and turps primers. Sterling Priming Paints are made with the view of combining the good features of varnish primers with even spreading qualities. Sterling Priming Paints not only cover well, but also overcome all the difficulties enumerated when ordinary oil paints are applied to certain kinds of woods.

Priming Paints are available in a range of colours necessary for any finishing colour.

"Primol."—For many years the Sterling Varnish Company has been manufacturing an economical and effective clear priming liquid known as "Primol." "Primol" seals the surface, gives good adhesion, and ensures that the paint will thoroughly dry and not blister. But, however, as it has no hiding power in painting work like "Silverglos" or Priming Paints, it cannot substitute a coat of paint in that respect.

Sterling Paints

STERLING HOME PAINT.—Sterling Home Paint contains no white lead as its base. Not only is white lead very dangerous to workers in the course of manufacture, but it continues to be so during the whole life of the paint. Were it necessary to use white lead to ensure quality in paint, there would be an excuse, but that fallacy has long since been exploded.

At the Geneva Conference (Internal Labour Conference) Questionaire 3 (b) reports:—

"The numerous and minute researches which have been made in many countries for many years past have placed it beyond doubt that oxide of zinc properly treated can be used as a basis of a product giving every advantage given by White Lead, whether in covering power, drying qualities or durability." As regards solidity, the report states.—'The comparative experiments made with pure Zinc White lead to the conclusion that for interiors they are much superior to White Lead, and as good for exterior use, for wood they are equally good either for interior or exterior use." Also that, 'White Lead is not better than Zinc Whites from the point of view of resistance to atmospheric changes."

Experience and careful elimination tests have brought the formulae of Sterling Home Paint to its present high standard. A certain proportion of the linseed oil is specially processed to give it increased durability. Such oils are expensive and cannot be purchased by the painter. This has a bearing upon the assertion that paints that are hand mixed are superior to those prepared by the manufacturer.

Sterling Home Paints have proved themselves equal to the trying conditions of the Australian climate. Their resistance to the corrosive action of salt air is appreciated in coastal districts where salt-laden atmosphere is the most insidious enemy of paint.

"T.Z.O." (Titanium Zinc Oxide).—The after-yellowing of white paints has been traced to linseed oil itself. Certain pigments, notably Titanium, have the power to mask this yellowing. "T.Z.O.," combining as it does the high covering power of Titanium and the smooth hardness of a zinc white paint, represents the ideal white paint for exterior and interior work. Sulphur gases present in city atmospheres have no blackening action upon "T.Z.O." Paint as Titanium Oxide is inert.

The great durability and purity of whiteness of "T.Z.O." has established it in the esteem of users.

"SAVOX" (Paste White).—For those who prefer to mix their own paint "Savox" affords the means required. It is a special Titanium Zinc white in oil and has the same properties as "T.Z.O." in providing purity of whiteness, high covering power and resistance to heat, sea air, corrosive gases, etc. "Savox," carefully prepared, will provide finishing paints of the highest grade. One cwt. will provide 9 to 9½ gallons of high grade paint.

Specification No. 15

Home Paints and "T.Z.O." Paints on New Woodwork.

Because of the reasons set forth in the previous notes on priming treatments, Priming Paints and "Silverglos" are the most efficient primers for new exterior woodwork, and should be used in preference to "Primol." The three treatments, however, are given below.

PREPARATORY TREATMENT.—Treat all knots with a coat of "Silverglos" unless that paint is used as a primer. Putty all nail holes and cracks after the first coat of paint.

Painting Methods.

Priming Method	Method 1 Using Sterling Priming Paints	Method 2 Using Aluminium Paint ("Silverglos")	Method 3 Using "Primol"
Priming Liquid	—		1 coat "Primol"
Drying Time			Overnight
Priming Coat(s)	2 coats Sterling Priming Paints	1 coat "Silverglos"	2 coats Sterling Home Paint or "T.Z.O." Paint thinned with 10% of Turpentine
Drying Time	24 hours between coats	Overnight	24 hours between coats
Finishing Coat(s)	1 coat Sterling Home Paint, or "T.Z.O." Paint, plus 5% Raw Linseed Oil	2 coats Sterling Home Paint or "T.Z.O." Paint	1 coat Sterling Home Paint or "T.Z.O." plus 5% Raw Linseed Oil

Specification No. 16

"Savox" (Paste White) on New Exterior Woodwork.

See notes in Specification No. 15 regarding knotting and puttying.

Primer	Second Coat	Finishing Coat
"Savox," 1 cwt. Raw linseed oil, 3 gals. Turpentine, 2 gals. Terebine, 2 pints	"Savox," 1 cwt. Raw linseed oil, 4 gals. Turpentine, 1 gal. Terebine, 2½ pints	1 cwt. "Savox" 5 gals. raw linseed oil 2½ gals. raw linseed oil or *2½ gals. pale boiled linseed oil 3 pints Terebine for raw oil above or 1½ pints Terebine for mixed oils

NOTE.—In the finishing coat it is highly desirable to replace one half of the raw linseed oil with pale boiled linseed oil.

Specification No. 17

Sterling Oil Paints and "T.Z.O." Paint on Old Exterior Woodwork.

It is impossible to lay down any hard and fast rules as to the adjustment of priming coats on old work because of the varying absorption of old paint.

Any adjustments, however, are of a simple nature as none of the difficulties of new wood are encountered. If the paint is hard and non-porous the addition of turpentine alone to prepared paints is sufficient to meet the requirements.

In the case of dry or "hungry" work, thinning with a mixture of equal proportions of raw linseed oil and turpentine will satisfy absorption and give freedom of brushing. Unnecessary excess of oil in priming coats should be avoided, as fundamentally it is the pigment which protects, rather than the oil. Reliance is placed upon the oily finishing coat to lock any excess pigment. A desirable oil to turps ratio is 3.2 or even 1.1 in priming paints. Sterling Priming Paints may stand some thinning with the mixture of oil and turps on "hungry" work; likewise "Silverglos", while Sterling Home Paint and "T.Z.O." Paint require adjusting with turps alone.

If a priming paint has been satisfactorily adjusted only in extreme cases will the second coat show much absorption, and work may proceed on the lines indicated for finishing new work.

BLISTERED PAINT WORK.—As the wood has most probably been previously soaked with oily paints, burning off is necessary, and the safest primer to use is "Silverglos," which will prevent a repetition of blistering.

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From the collections of Sydney Living Museums / Historic Houses Trust of NSW

SECTION II.—EXTERIOR PAINTING, VARNISHING AND ENAMELLING —(*continued*)

STAINED FINISHES—Sterling Exterior Stains are made in all colours to imitate natural woods They yield a glossy protective finish, richer in effect, and more waterproof than ordinary oil stains. They combine utility and decorative value to the best advantage. Also made in Morris Green.

Stains to give flat effects similar to natural woods—oak, mahogany, cedar, etc., and Morris Green—are also made. They are more economical, though not so preservative as the gloss stains.

Specification No. 18

Exterior Wood Staining.

Apply 2 coats of Sterling Exterior Stains of selected tone. The first coat shall be applied liberally to soak the surface. Allow 8 hours for drying before applying second coat

Note—The second coat gives a protective gloss finish

STAINED FINISHES—"Sevac" "Non-scratchable" Varnish.—Varnish is used for its glossy appearance, but if that surface will not stand wear and tear, and becomes scratched and dull, obviously a coat of boiled oil would be nearly as effective and much cheaper. "Sevac" 'Non Scratchable" Varnish stands out from other varnishes because of the extraordinary toughness of its film, which resembles celluloid more than oil varnish film. It is comparatively quick drying, and will neither spot with rain nor bloom in bad weather

Specification No. 19

Exterior Wood Stained and Varnished Finish.

All surfaces shall be cleaned free from dust and grease, and be properly dry before application

Apply a liberal staining of Sterling Flat Oil Stain and finish with two coats of "Sevac" "Non-Scratchable" Varnish.

OLD WORK.—Remove old paint or varnish with Sterling Paint and Varnish Remover according to the directions on the can. Ensure that work is absolutely clean before proceeding as before.

ENAMELLED FINISH—Sterling Durable Enamels, as the name indicates, are made to withstand exposure and rough usage, and are particularly adapted for doors, porches, etc. When thoroughly hard they will stand cleaning with mild abrasive soaps

Specification No. 20

Enamelled Finish to Woodwork.

Give woodwork 2 coats of Sterling Priming Paint of a colour approximating that of the finishing enamel. Allow 24 hours between coats and sandpaper lightly with fine paper.

Finish with 2 coats of "Durable" Enamel, allowing 12 hours between coats. All surfaces must be clean and smooth before commencing work.

Metallic and Galvanized Iron Surfaces

Galvanised Work.—There are many preparations designed to make paint adhere to new galvanised iron, but none have proved completely satisfactory. The only safe method is to allow the galvanised iron to weather sufficiently. The expansion and contraction of galvanised roofs is excessive for the adherence of oil paints, and consequently paints of a semi-varnish type form the basis of specific coatings for this work. Sterling "Roofrite" is of this type and has proved highly satisfactory. It is non-poisonous and will not contaminate drinking water drained from the roof to which it is applied "Roofrite" is available in 10 colours

Where rust has commenced its destructive work, a treatment of "Fish-O-Lac" (see Specification No. 4) preparatory to painting will check and stop any further corrosive action.

Specification No. 21

Painting Galvanised Roofs.

*NEW WORK—After the galvanised surfaces have sufficiently weathered, paint with one coat of Sterling "Roofrite." Additional Safeguard for New Work.—Prime with "Fish-O-Lac" as in Specification No. 4, and paint with 1 coat of Sterling "Roofrite." Rusty Roofs—See Specification No. 4.

*Note. Whenever the colour of the paint permits, only one coat of pigmented paint should be applied to sound metal roofs.

STRUCTURAL STEEL. Sterling Structural Steel and Roof paint and Sterling "Roofrite" are equally efficient for all metal painting. Both are non-poisonous

Specification No. 22

Painting Structural Steel (see also Specification No. 4)

Structural steel should be painted, by preference, in the morning only. Loosely adhering rust should be removed with a steel brush. One coat on metal work has better adhesion than 2 coats, and where the colour of the paint permits, only one coat should be given. If 2 coats are given 24 hours should be allowed between coats. Use Sterling Structural Steel Paint or "Roofrite."

ALUMINIUM PAINTS—"Silverglos" Aluminium Paint has a high resistance to heat, and in hot districts it provides a roofing paint capable of lowering the internal temperatures as much as 10 degs. F., when compared with the internal temperature of a building with a red painted roof. Because of its ability to reflect the sun rays, "Silverglos" is frequently used on water tanks and petrol storage tanks, where it considerably lessens the losses of the contents caused by evaporation

Specification No. 23

Aluminium Paint on Exterior Metal Work and G.I. Roofs.

The surfaces must be thoroughly clean and free from rust, old paint, etc Apply one coat of "Silverglos," brushing it out to a uniform and even coat. Stir well before and during use. If too thick add a little turps.

SECTION III.

INTERIOR PAINTING, VARNISHING AND ENAMELLING

PREPARATION OF SURFACES

Woodwork

It has already been noted that cedar, redwood and certain types of oregon need particular care when painting

These woods, through developing vapours which penetrate paint, keep the film perpetually soft. The addition of excess driers to the paint accentuates the trouble, and, needless to say, the use of thin oil primers that is customary to use only aggravates the condition. The practice of liming woods is a bad one, as free lime adversely affects paint.

The object of filling is to pack the grain of the wood with a non-shrinkable adhesive paste which will retain its binding liquid, dry hard and quickly, and remain unaffected by the solvent action of paint or lacquer. For the best work there has been found no alternative to the paste filler, as it is evident that the heaviest liquids must sink into the crevices Oil fillers have the defect that they contract during the drying period They are slow and thus leave too much time for the oil to soak away from the pigment and still leave the surface "hungry" and absorbent "Sevac" Neutral Paste Filler is a typical filler that answers the most exacting trade requirements. The filler is smeared over the woodwork and the surplus rubbed off with bagging across the grain of the wood This action presses the paste into the spaces. After one hour the wood is sandpapered and is ready for painting or lacquering The appearance of two coats of paint on filled wood is preferable to that obtained by four coats on unfilled wood Paint raises the grain of the smoothest wood, paste wood filler prevents the raising of the grain The advantages of "Primol" as a priming treatment have been referred to in Section II. 'Primol' is recommended as the best alternative for a paste wood filler If 'Primol" is used in addition to the paste filling treatment, an exceptional binding action is set up between the solution of the paste filler and the liquid "Primol," forming one of the best possible preparations for interior painting and enamelling

It will be of interest to note that:

1 **Enamelling**—Especially the glossier the finish shows the irregularities of the surface—hence the need for a sound preparation when using a high grade enamel

2 **Flat Paint Finishes** reveal the irregularities the least, and in addition to being of a more porous nature, they rarely, if ever, are subject to troubles connected with gloss paints. At the same time the cheapest work should allow for a coat of priming

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SECTION III.—INTERIOR PAINTING, VARNISHING AND ENAMELLING—*(continued)*

Plaster

The hardness of plaster depends upon the interlocking of hydrated crystals. An excess of water allows for the duration of the action. Therefore, any paint of a nature which seals the wall before the reaction is complete will also stop the setting action. Minor variations in the proportioning of plaster will considerably affect the paint applied over it by showing varying degrees of suction. Indifferent mixing may leave hard spots of gypsum surrounded by soft spots of lime, or vice versa. If both gypsum and lime are equally white, this is not easy to detect by simple inspection. Even with approved alkali resisting liquids or paints these spots continue to show through several coats, the paint presenting a mottled appearance. This is still evident when lime resisting colours are used, as it is due to widely different suctions and textures. Sanding these spots offers no remedy. Flat finishes mask these blemishes, but high gloss finishes accentuate them.

The importance of a good foundation in the case of plaster [illegible] reducing the need for excessive paint [illegible] coats.

A solution of zinc sulphate, 2 lbs. per gallon of water, brushed over the surface is a preliminary sealer of greater value. At least 48 hours must be left after application for the reaction to complete. The reaction between lime and zinc sulphate results in the formation of calcium sulphate and zinc hydroxide finely deposited in the interstices of the plaster. A coat of "Primol" concludes the preparatory work. "Primol" is not only a sealer by virtue of its varnish-like nature, but reacts chemically with the surface and further disguises imperfections in plaster. If persistent dampness is present, the application of one or two coats of "Sevac" Brushing Lacquers as already described in [illegible] page 3) is advisable.

Fibrous Plaster

The remarks applying to plaster also may apply to fibrous plaster in a lesser degree.

Metalwork

The sanding of metals greatly facilitates adhesion. Burnished metals should be noted as dangerous surfaces. Burnishing pastes contain fatty acids which leave a microscopic film of these acids on the surface. Sanding with benzine removes them and permits metal paints or lacquers to adhere. Rough metals require filling with either Universal Filler (oil base) or Pyroxylin Primer and Surfacer, according to circumstances. The company will be pleased to suggest the best methods to be employed with any type of metal that may be encountered.

PRODUCTS AND SPECIFICATIONS

Sterling "Hometone" Flat Paint

Sterling "Hometone" is a washable oil paint for interior use on plaster, woodwork, wallboards and metal ceilings. It dries to a dull flat paper-like finish of exquisite texture. In addition to this beauty of finish, its sanitary and economical qualities are of almost equal importance. "Hometone" permits easy application, has strong hiding power, and its property of levelling out without brushmarks is a feature. Its unusual wet edge, which permits the painter to get back into it long after other types of flat paints have dried to a stage where brushing is impracticable, is of the greatest assistance to the tradesmen.

Specification No. 24

Flat Paint Finish on Plaster and Fibrous Plaster.

See notes re Plaster under heading of "Preparation of Surfaces." Apply a priming coat of "Primol" and allow 12 hours for drying. Finish with 2 coats of Sterling "Hometone" Flat Paint of selected colour, allowing 24 hours between the application of each coat.

OLD KALSOMINE.—Wash down and remove old kalsomine and treat as new walls.

Specification No. 25

Flat Paint Finish on Woodwork.

See notes re Woodwork under the heading of "Preparation of Surfaces."

Prime with one coat of Sterling Priming Paint of suitable colour.

Finish with two coats of Sterling "Hometone" Flat Paint of selected colours, allowing 24 hours between the application of each coat.

Specification No. 26

Flat Paint Finish on Metal Work.

Give two coats of Sterling "Hometone" Flat Paint, allowing 24 hours between coats.

Priming is not necessary provided the metal is prepared (see note under "Metal work")

Sterling "Four Hour" Enamels

Not many years ago, had the enquiry been made to paint manufacturers as to the possibility of producing either an enamel or varnish of high durability and a drying rate within 4 hours, the answer would have been unquestionably "No." As painters' enamels are made by grinding pigments in a varnish, the question resolves itself into one of the ability to make a suitable varnish for the purpose. Varnishes are essentially combinations of oil and gum resins.

By the old method of varnish making a high proportion of gum resin and a low proportion of oil yields a quick drying but brittle varnish of poor durability; and a varnish low in gum resin and high in oil, one of high durability, but slow drying. This preliminary explanation is necessary to show that the Sterling "4 Hour" Enamel is radically different from the old type of quick enamel inasmuch as the correct balance between oil and gum resin required for durability has been observed, yet the process produces a quick drying film of extreme gloss and toughness. The obvious deduction is that such enamels made with a varnish containing a correct balance of oil to gum resins, must be free flowing and easy working under the brush, and such is the case. The old, quick type of enamel of low durability was sticky and difficult for the painter to manipulate, and a slow drying but durable enamel was marred by the adhesion of dust and flies and other troubles incidental to slow drying paints.

The outstanding qualities of "4 Hour" Enamels may be summed up as follows: Extremely resistant to abrasion, impervious to water, resistant to soap, mild alkalis and acids, kerosene and petrol, easily cleaned and polishable.

Specification No. 27

Enamel Finish on Plaster and Fibrous Plaster.

(See notes re Plaster under the heading of "Preparation of Surfaces").

PRIMING (to stop suction).—1 coat of "Primol." Allow 12 hours for drying.

UNDERCOATING.—Apply an undercoating consisting of 28 lbs. "Savox" and ½ pint Terebine, reduced to brushing consistency with turpentine. Allow 24 hours for drying.

FINISH.—2 coats of Sterling "Four Hour" Enamel of selected colour.

Specification No. 28

Enamel Finish on Woodwork.

(See notes re Woodwork under the heading of "Preparation of Surfaces")

PREPARATION OF SURFACE.—Putty large holes, fill wood with Sterling 1071 Paste Wood Filler and sand down.

UNDERCOATING.—After two hours apply an undercoating consisting of 28 lbs. "Savox" and ½ pint Terebine, reduced to brushing consistency with turpentine. Allow 24 hours for drying.

FINISH.—2 coats of Sterling "Four Hour" Enamel of selected colour.

Specification No. 29

Enamel Finish on Metal.

After the surface of the metal has been cleaned (see Metalwork under the heading of "Preparation of Surfaces"), apply 2 coats of Sterling "Four Hour Enamel" of selected colour.

NOTES.—Primers need not be used, excepting for aluminium and lead. Prime aluminium with "Silverglos" and enamel as before. A special primer for lead has been prepared by the Sterling Varnish Company.

"Durable" Enamels are recommended for radiators and pipes.

Sterling Water Paints

The hiding or covering powers of Sterling Water Paints are distinctive and have no relation to the covering power of kalsomines or common water paints. They are well bound and will not crack nor peel. Made in white and popular tints.

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SECTION III—INTERIOR PAINTING, VARNISHING AND ENAMELLING *(continued)*

Specification No. 30

Water Paint Finish on Plaster and Fibrous Plaster.

Treat the wall with a coat of "Primol" to stop suction and bind the surface

After 12 hours apply 2 coats of Sterling Water Paints. The second coat may be given as soon as the first is visibly dry.

Sterling Mill White

Sterling Mill White will provide an economical white finish to interior brick walls, concrete, plaster and fibro cement. It requires only the addition of water to prepare it for use.

Specification No. 31

Mill White Finish for Interior Brickwork, Concrete, Plaster, etc.

The surfaces to be covered shall receive 2 coats of Sterling Mill White. Allow the first coat to thoroughly dry before applying the second coat. In mixing, add sufficient water to make the paint of a creamy consistency.

NOTE.—One coat is often sufficient

Sterling Home Paint

For description, see Section II, S.-V.—Page

Specification No. 32

Paint Finish on Woodwork.

Refer to Specification Nos. 15 and 16. See also notes re Woodwork under the heading of "Preparation of Surfaces," S.-V.—Page 6.

Specification No. 33

Paint Finish on Plaster.

See notes re Plaster under heading of "Preparation of Surfaces" (S.-V.—Page 6).

PRIMING.—1 coat of "Primol" for sealing surface. Allow 12 hours for drying.

FIRST COAT.—1 coat of Sterling Home Paint reduced with 10 per cent. of turpentine. Allow 24 hours for drying.

FINISHING COAT.—Add 5 per cent. of raw linseed oil to the finishing coat of Sterling Home Paint.

Sterling "T.Z.O." (Titanium Zinc Oxide)

It has already been pointed out in Section II, S.-V.—Page 5, that Titanium has the property of masking the after-yellowing caused by linseed oil in white paints "T.Z.O.," which combines the masking and high covering powers of Titanium, and the smooth hardness of a zinc white paint, will be found to be ideal for interior use, especially in darkened interiors.

Specification No. 34

"T.Z.O." (non-yellowing) White Finish on Interior Woodwork.

Refer to Specification Nos. 15 and 16.

Specification No. 35

"T.Z.O." (non-yellowing) White Finish on Plaster.

Procedure according to Specification No. 33.

Specification No. 36

White Paint Finish on Metal.

Oil paints are uncertain as regards adherence to metals. Sterling Home Paint Primer is adapted for either metal or wood; therefore, a priming coat of this paint will assure adhesion.

One coat of Sterling White Home Paint Primer. Drying period 24 hours. One coat of Sterling White Home Paint. No thinners required

Sterling Interior Stains

Sterling Interior Stains consist of Flat Oil Stains and Glossy Oil Varnish Stains

Flat Oil Stains require one coat only and are both attractive and economical

Glossy Stains are more sanitary, as the surface is non absorbent. Tones imitating all natural woods are available in both Flat and Glossy Stains.

Generally speaking, all glossy stains reveal imperfections in woodwork while flat stains tend to disguise faults. For Glossy stains a priming of "Primol" will provide a suitable filling coat and when finished with Sterling Glossy Oil Varnish Stains the result will be a high grade lustrous finish with a non-absorbent surface

Specification No. 37

Stained Finish.

All surfaces must be clean, dry and free from grease.

FLAT FINISH.—1 coat of Sterling Flat Oil Stain of selected tone

GLOSS FINISH (superior).—One coat of "Primol," drying time 12 hours. Two coats of Sterling Varnish Stains of selected tone. Allow 8 hours drying time between each coat.

ORDINARY GLOSS FINISH.—Two coats of Sterling Varnish Stains. Allow 8 hours drying time between each coat.

Sterling Interior Varnishes

Sterling Varnish Company manufacture a range of varnishes suitable for all internal uses.

Sterling Carriage Varnish.—Given proper preparation of woodwork, the life of Sterling Inside Oak Varnish may be said to be indefinite, and, unless provision has to be made for some unusually rough treatment, it will satisfy all requirements. Its "filling" power and glossy finish is unusual.

Sterling Eggshell Flat Varnish.—Provides an attractive finish for flat varnishing and stain work

Sterling Eggshell Gloss Varnish.—Provides an eggshell sheen. Used where a compromise between a flat and gloss finish is desired

Specification No. 38

Varnish Finish.

All surfaces must be clean, dry and free from grease. Apply 2 coats of Sterling Hardoak Varnish. Allow 12 hours for first coat to dry before applying second coat.

NOTE.—A priming of "Primol" will always provide a good preparatory treatment to uncertain woodwork.

Specification No. 39

Stained and Varnished Finish—Eggshell Flat.

All surfaces must be clean, dry and free from grease.

FIRST COAT.—One coat of Sterling Flat Oil Stain of selected colour. Allow 12 hours for drying

SECOND COAT.—One coat of Sterling Eggshell Flat.

NOTE.—A priming of "Primol" will always provide a good preparatory treatment to uncertain woodwork.

Specification No. 40

Stained and Varnished Finish—Eggshell Gloss.

All surfaces must be clean, dry and free from grease.

FIRST COAT.—One coat of Sterling Flat Oil Stain of selected colour. Allow 12 hours to dry.

SECOND COAT.—One coat of Sterling Hard Oak Varnish. Allow 12 hours to dry.

THIRD COAT.—One coat of Sterling Eggshell Gloss Varnish.

NOTE.—A priming of "Primol" will always provide a good preparatory treatment to uncertain woodwork.

Sterling Floor Stain and Varnish

Sterling Floor Stain (Flat Oil Stain) has an advantage over simple dye stains, because the oil it contains is a preservative which enriches the wood and gives a distinctive appearance. Sterling Floor Varnish is specially manufactured to stand up to hard wearing conditions

Specification No. 41

Stained Floors.

Flat effects can be simply produced with one coat of Sterling Flat Oil Stains.

Specification No. 42

Stained and Varnished Floors.

One coat of Sterling Flat Oil Stain of selected colour
Two coats of Sterling Floor Varnish
Allow 12 hours for drying between each coat

Sterling "Silverglos" Aluminium Paints

The damp-proofing properties of "Silverglos" on woodwork, and the increased durability of oil painting where it has been used as a primer have already been mentioned. "Silverglos" is equally as effective when applied to interior surfaces as when used externally. The flaky particles of the metal have the property of "leafing" on the surface of the paint medium, forming an impenetrable film.

A remarkable proof of this flotation may be seen by making a paint of Black Japan and Aluminium Powder. When painted on no trace of the black medium is visible, it is all bright aluminium. That in itself may be considered insufficient proof of the "leafing" together of the particles, but this may be gauged by the fact that it is even possible to paint a common tar paint with white oil paint provided a coat of aluminium paint is given first. Only Gold Leaf is capable of behaving similarly, as tar penetrates and discolours all oil paints.

"Silverglos" has a high resistance to heat and does not tarnish, and is therefore invaluable for radiators and machinery. It is durable and retains its bright finish on all surfaces.

When considered that a single coat of "Silverglos" effectively covers a surface like black iron it will not be found expensive.

Specification No. 43

Aluminium Paint on all Surfaces.

Remove all loose paint, dust, rust and apply one coat Sterling "Silverglos" brushed out to a uniform finish

NOTE.—The above may also form a priming coat for all metal surfaces to be enamelled or painted

(Continued on next page)

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SECTION IV.—"SEVAC" PYROXYLIN LACQUERS
(For Interior Decoration)

General

Probably no other field of decorative work offers such opportunities for the manufacturers to co-operate with the architect in producing striking decorative effects Antique metals can be so faithfully reproduced that it would deceive anyone but the initiated Frequently a specimen or example of the metal it is desired to imitate is required by the lacquer manufacturer in order to formulate a suitable combination for the work This work is readily undertaken, although it may involve some preliminary experimenting The resources of the lacquer manufacturers have scarcely been tapped in this direction—wood, paper and plaster may be as readily converted into masses of bronze or platinum as metallic ceilings or steam piping

The cost of producing these effects is not nearly as great as is commonly imagined, as wall effects of great originality can be produced economically by any able craftsman by means of the portable spray gun. Plain paper, because of its absorbency, yields flat effects The stencil work done with spray excels the finest handwork. The colours are more resistant to lime and stains than oil paints and more resistant to water than printed wallpaper The highest grade lacquers, such as car lacquers, are, in most cases, neither as suitable nor even as good for this work

The consequence is that with great reductions in material cost, decorative lacquers for interior use deserve greater consideration by the architect

On woodwork advantage has not been sufficiently taken of the fact that owing to the thinner film of lacquer compared with paint eggshell effects may be economically obtained with one or two coats of lacquer sprayed by means of a portable spray machine The foundation must be perfect, but if carried out according to the schedule below, success is assured Flat or semi-flat finishes may be produced very economically either in stained or solid effects The cost of producing high gloss finishes in lacquer has prejudiced its use in interior decoration on woodwork.

Metallic Effects

Metallic Effects. Florentine Bronze, Brass Copper, Antique, Pale Gold, Old Gold, Roman Metal, Silver, Moon Metal, Fire Bronze This is a new departure in the field of lacquer preparations. Previously it was necessary to mix the bronze powders with a pyroxylin lacquer medium just before spraying, as a detrimental reaction is set up between the bronze powder and the lacquer Now these are supplied ready blended for use the result being that a very much better finish is obtained. The finest effects are produced by finishing with a clear pyroxylin lacquer on top of the bronzes This preserves them from gradual tarnishing Some remarkable effects may be produced this way

Sevac Bronze Lacquers may be sprayed or brushed, on paper, woodwork fabric and metal work, and are admirably adapted for relief work

Metallic Shading Effects on Coloured Lacquers

Owing to their composition the bronze lacquers have not the blistering or "raising" effect when superimposed on other coloured lacquers for shading effects or lining work This also facilitates stencil work and equally makes the application of a spraying of protective clear lacquer a safe operation

Granite-Like Effects With Bronze Lacquers

These are easily obtained—The streaks and splashes of fine granite are imitated by means of an air gun spraying heavy bronze lacquers upon a suitably coloured lacquer foundation The scheme is well adapted for the decoration of columns, pillars and wall panels A "spotting gun" is required for spraying the bronze lacquers

A foundation colour having been chosen—say black lacquer for a black granite—the next step is to "grain" it. One or more bronze lacquers may be chosen The bronze lacquer is put in the gun "without thinners," and by holding the gun nearly parallel with the surface and releasing the trigger lightly and intermittently the grained effects are produced. Varying the angle crosses the pattern of the grains

Finally, two sprayings of clear lacquer preserve and enrich the appearance of the surface. This may be pulled over or polished if so desired.

Lacquered Grain Wood Effects on Steel

By this means the beauty of grained woods may be combined with the structural efficiency of pressed steel A lacquered finish leaves nothing to be desired from the utilitarian point of view, while there is a dignified appearance in polished grained woods that lends distinction, particularly to public buildings and large apartments

In this process a special foundation priming coat is either sprayed or brushed on the steel The colour of this coat corresponds to the type of wood it is desired to copy When dry this coat is rubbed perfectly smooth Graining is done at this stage by means of very fine pigments bound in a water medium, after the usual manner. Several coats of clear pyroxylin lacquer are then given This is levelled and polished or burnished by the same process as is adopted in producing high-grade furniture or "piano" finish The graining being seen through a depth of clear lacquer rivals the finest french polish work in appearance

SPECIFICATION SCHEDULE OF "SEVAC" LACQUER FINISHES

Clear Lacquer Finishes on Woodwork

PREPARATION OF SURFACES

Prepare the woodwork by filling with "Sevac" Paste Wood Filler of the colour of the wood it is desired to imitate (note—"Sevac" Paste Wood Fillers have the stain combined with the filler) Rub the filler against the grain of the wood, using hessian bagging Wipe clean, leave an hour to dry, and sandpaper with fine paper in the same direction as the grain.

HIGH GLOSS.—*Specification No. 44*

Spray the prepared woodwork with three or more coats of "Sevac" 1460 Furniture Lacquer. "Pull over" lightly to level off, and burnish with "Sevac" Medium Burnishing Paste.

SEMI-FLAT.—*Specification No. 45*

Spray the prepared woodwork with two coats of "Sevac" 1460 Furniture Lacquer. Finish with one coat of "Sevac" Eggshell Flat Lacquer

FLAT.—*Specification No. 46*

Spray the prepared woodwork with two coats of "Sevac" 1460 Furniture Lacquer Finish with one coat of "Sevac" Flat Lacquer.

Coloured Lacquer Finishes

ON WOOD.— *Specification No. 47*

Prepare the woodwork by filling with "Sevac" 1071 Neutral Paste Wood Filler (colourless). Rub the filler against the grain of the wood, using hessian bagging. Wipe clean, leave an hour to dry, and sandpaper with fine paper in the same direction as the grain Spray or brush two coats of "Rex Lacs" (nitro-cellulose lacquers) of the desired colour.

ON METAL.—*Specification No. 48*

If the surface is clean and smooth, brush or spray two coats of "Rex Lacs." On rough metal surfaces, apply one or more coats of a suitable filler such as Universal Filler (oil base), or White, Black or Grey Pryox Primer and Surfacer. Sandpaper smooth with fine paper, and spray with two coats of "Rex Lacs."

ON PLASTER.—*Specification No. 49*

Flat effects on plaster may be obtained by means of a single spraying with "Rex Lacs." Gloss effects are best produced by first spraying with Shellac Solution, 3 lbs. per gallon of spirit to seal the surfaces. Finally spray two coats of "Rex Lacs."

BRONZE FINISHES.—*Specification No. 50*

One spraying or brushing of "Sevac" Bronze Lacquers is sufficient to cover metal, plaster, wood or fabric. Special bronze thinners are provided for spraying. Owing to the absorption of porous surfaces, the effects are somewhat different to those on non-porous surfaces. To obtain uniform effects, porous surfaces like plaster should be first filled by spraying with a solution of Shellac in spirit, 3 lbs. per gallon. Wood may be filled with 1071 Neutral Paste Wood Filler. For large scale work further interesting particulars will be gladly given on request.

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25 S.A.A. File No.	**TAUBMANS LIMITED** Manufacturers of PAINTS, VARNISHES, ENAMELS, STAINS AND LACQUERS Head Office and Factories: MARY STREET, ST. PETERS, SYDNEY.	A GUARANTEE A TAUBMANS PRODUCT OF SATISFACTION

AERIAL VIEW
OF FACTORY AND WORKS,
ST PETERS.

BRANCHES:

MELBOURNE Taubmans Pty. Ltd., 24 Lonsdale Street.
BRISBANE—Taubmans (Q'land) Pty. Ltd., 95 Edward Street.
PERTH—Taubmans Limited, Surrey Chambers, St. George's Terrace
ADELAIDE—Agents, Messrs. L. G. Abbott & Co. Ltd., 83 Grenfe l Street.
NEW ZEALAND—Taubmans (N.Z.) Ltd., Wakefield Street, Wellington.

TAUBMANS PRODUCTS

The range of products bearing the Taubman name completely covers every requirement for the beautification and protection of every type of surface. The manufacture of the various Paints, Varnishes, Stains, Enamels and Lacquers described on the following pages is carried out under the strict supervision of an expert laboratory staff in collaboration with men of long actual painting experience, and each product can be relied upon to be thoroughly dependable. The specifications given with the description of each product are sufficient for general conditions only, and should a special finish be required, or unusual conditions encountered, the services of our Practical Finishing and Research Departments are at your disposal. Preparation of the work and the conditions under which it will be carried out are essential to satisfactory results.

Because of this, we have, employed on our staff in Sydney and at each of our Branches, representatives fully conversant with all conditions and thoroughly competent to prescribe the correct product to give the desired result and the proper method of its application. We wish all users of Taubman Products to avail themselves of this service, for which there is no obligation imposed

(Continued on next page)

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PAINT SPECIFICATION CHART

SURFACE	WHEN PAINTING	WHEN STAINING	WHEN VARNISHING	WHEN ENAMELLING	WHEN LACQUERING
EXTERIOR WALLS CONCRETE CEMENT RENDERED FIBRO-CEMENT SHEETS	Taubmans Cement Proof Paints, or Zotena Water Paints, or Staywhite (Mill White)				
BRICK WALLS (Exterior)	Butex Vitafused Oil Paint, or "Tradex," or Trade Service White		Solpah Weather-Proof Oil (Clear Waterproofing)		
NEW WALLS	See Spec. Cement Proof Paint				
WOODWORK (Exterior)	Butex Vitafused Oil Paint, or "Tradex" or Trade Service White	Penetrol Oil Stains	All Service Oak or Decorators' Exterior Copal or Solpah Weather-Proof Oil	Gloma Enamel (White) or Pearline Enamel (Colours)	
METAL SURFACES (Exterior) ROOFS, GUTTERINGS, FENCES, GATES, FIRE ESCAPES, TANKS, Etc.	Solpah Roof and Structural Paint, or Silvafros				
FLOORS, WOOD (Exterior)		Penetrol Oil Stains	Solpah Weather-Proof Oil (Clear)		
CEMENT FLOORS AND PAVING (Interior and (Exterior)	Solpah Paving Paints				
INTERIOR WALLS CEMENT PLASTER	Butex Vitafused Oil Paint, or Russolene Flat Oil Finish, or Zotena Water Paints, or Staywhite (Mill White)			Gloma Enamel (White) or Pearline Enamel (Colours) See Spec for Undercoats	Fascinac Lacquers (Brushing and Spraying) See Spec
NEW CEMENT	Priming Coats should be of Cement Proof Paint, see Specifications				

[Chart concluded on next page]

(Continued on next page)

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PAINT SPECIFICATION CHART

SURFACE	WHEN PAINTING	WHEN STAINING	WHEN VARNISHING	WHEN ENAMELLING	WHEN LACQUERING
CEILINGS PLASTER	Russolene Flat Oil Finish, or Staywhite (Mill White)				
METAL	Butex Vitafused Oil Paint, or Russolene Flat Oil Finish. (See Spec. for Undercoats)				
INTERIOR WOODWORK TRIM, PANELLING, DOORS, CEILINGS.	Butex Vitafused Oil Paint or "Tradex" or Trade Service White — Russolene Flat Oil Finish (See Spec. for Undercoats)	Penetrol Oil Stains	Hard Drying Carriage Varnish or Fine Pale Copal, or Hard Drying Oak — Eggshell Flat, or Eggshell Gloss	Gloma Enamel (White) or Pearline Enamel (Colours) See Spec. for Undercoats	Fascinac Lacquers Clear and Colours (Spraying and Brushing)
WOOD FLOORS (Interior)		Penetrol Oil Stains	"Varneeros" Clear Varnish		Fascinac Floor Lacquer (Clear)
METAL SURFACES (Interior) PIPES, GRILLES, RADIATORS, Etc.	Russolene Flat Oil Finish (Most Efficient for allowing heat radiation) or Silvafros, or Butex Vitafused Oil Paint			Gloma Enamel (White) or Pearline Enamel (Colours)	Fascinac Lacquers (Brushing and Spraying)
CANE, LEATHER AND FLEXIBLE SURFACES					Riverlac Flexible Lacquer
CELOTEX	See Special Specifications (Page 228)				
UPSON BOARD AND SIMILAR COMPOSITIONS	Treat as Woodwork (Exterior or Interior)				

In the foregoing Specifications, the product first mentioned is for the highest class work, except where choice of finish, Gloss or Flat, is given.

(Continued on next page)

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GENERAL PAINTING INSTRUCTIONS

New Work

In all cases the surface should be thoroughly clean and dry.

Woodwork.—Sandpaper to smoothness and dust clean before priming. All knots and sappy places to have a coat of Taubmans Patent Knotting. In the case of Redwood, first treat with Lime Water to counteract the acid present in this timber when new. Apply three coats, following instructions for thinning given with the particular product to be used. Brush each coat out evenly and allow at least 24 hours to dry. Putty all nail holes and cracks before applying second coat. Lightly sandpaper second coat before applying finishing coat.

Plaster and Cement.—Follow instructions given with the products recommended.

Old Work

Woodwork.—Burn off and sandpaper where cracked, or peeling obtains, or otherwise necessary. Should Paint Remover be used, wash with soap and water, then twice with clean water, and allow to thoroughly dry before priming. Treat as new work.

Surfaces Not Burned Off. Remove any loose particles, sandpaper to smoothness and dust off to a clean surface. Surfaces where there is a likelihood of grease, such as kitchen surfaces, or where woodwork is much handled, should be treated with Lime Water. Putty all holes and cracks and apply two coats, following instructions given with the product used.

Specification No. 1

TAUBMANS CEMENT-PROOF PAINT

Made in White and suitable colours. Special colours will be made to order if not less than five gallons of any particular colour be ordered. **A feature of this paint is that it does not require priming solutions—a considerable saving in labour.**

It positively resists the chemical reaction of new cement, which, during the process of setting, liberates lime. It remains unaffected by this free lime (alkaline), which quickly destroys ordinary Linseed Oil Paints. This has been definitely proved by its use on numerous buildings applied over new cement, amongst them being the Masonic Club Building, Castlereagh Street, Sydney, where it has demonstrated its durability over a number of years.

Taubmans Cement-Proof Paint dries with a gloss that is particularly hard and absolutely waterproof, and will give entire satisfaction when used for both exterior and interior work.

Application. Three coats are necessary for the best results, but in many cases two coats have proved quite satisfactory.

Do not apply until all moisture has disappeared from the cement or brickwork. The paint should be applied undiluted this applies particularly to the first coat. On rough surfaces, should thinning be required for easy working, pure Turps only should be added. **On no account should Linseed Oil be added**

New Brick Walls.—One coat of full cover provides an excellent insulation against the alkaline action of the mortar in the joints. When brickwork is porous, two coats are advisable. Other paints may then be used for the finishing coats.

Specification No. 2

TAUBMANS TRADEX

Super Cover White Paste in Oil.

"Tradex" is tendered as our highest quality White Paste in Oil. Its durability exceeds that of any other combination of white pigments. This is particularly so when exposed to light, heat, sea water, and sea-moist atmosphere and air containing corrosive gases. Its covering properties are exceptional, it being possible to obtain a one-coat cover in white over a dark background. We invite you to apply this test. Paints made from "Tradex" are brilliant in white and clean and unchangeable in tints, and can definitely be described as non-poisonous. "Tradex" is easily broken up, brushes easily, flows out evenly and, if directions for thinning are adhered to, a high grade result must be obtained.

The film of "Tradex" Paint weathers slowly, does not crack or chalk, and gradually, but imperceptibly wears to an even surface while always retaining its weatherproofing, preserving and decorative properties. When repainting ultimately becomes necessary, the film has become an ideal undercoating surface, there being no need for expensive burning off or sandpapering. This characteristic is peculiar to the blend of pigments contained in "Tradex" and is quite distinct from the severe cracking and chalking of Zinc Oxide and White Lead respectively. We recommend "Tradex" for all interior and exterior work and where maximum durability is the objective. One cwt. yields 9 to 9½ gallons of full cover paint

MIXING DIRECTIONS. (To each One Cwt.)

First Coat on New Work.—Add 5½ to 6 gallons Raw Linseed Oil and ¼ to ½ gallon Pure Turps.

Second Coat.—Add two gallons Pure Turps and ½ gallon Raw Linseed Oil. Sufficient Turps is necessary to cut the gloss and ensure against cissing of finishing coat. Do not over-thin with oil and affect opacity and covering.

Although yield is less for second coat, it will spread almost as far as in first coat or finishing coat.

Finishing Coat.—Add 5½ to 6 gallons Raw Linseed Oil and pint to ¼ gallon Pure Turps. Dryers are to be added to each coat. The use of Mineral Turps is not advisable.

REPAINTING OLD WOODWORK.

First Coat. Follow instructions given for second coat on new work. Finish as for new work

Specification No. 3

TAUBMANS TRADE SERVICE WHITE

A dense, pure White based on highest grade Zinc Oxide and Titanium. It is similar in composition to "Tradex" and is supplied in ready-mixed heavy bodied form; 1½ gallons of oil or turps may be added to each four gallons. The user is saved the time and labour of mixing, yet is able to apply what is practically a different mixing for each coat. Taubmans Trade Service White gives exceptional covering, spreading and durability and freedom from cracking, powdering and discoloration. It will take the same Stainers as White Lead and not chemically react. As a medium between Paste Whites and Ready Mixed Paints it has attained great popularity in the painting trade.

Full directions for thinning for each coat are given on each container

(Continued on next page)

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BUTEX VITAFUSED OIL PAINT

Distinct from and Superior to all other High-Grade House Paints, possessing vital and desirable properties unobtainable in any other product.

LIGHT STONE
MID STONE
DARK STONE
SIENNA STONE
TOBACCO BROWN
INDIAN RED
VELVET BROWN
CHOCOLATE

ALSO WHITE

IVORY
BISCUIT
CREAM
YELLOW STONE
WEDGWOOD GREY
STEEL GREY
TURQUOISE
SLATE GREY
SALMON

LAKE GREEN
SEA GREEN
LIGHT PERMANENT GREEN
MID PERMANENT GREEN
DARK PERMANENT GREEN
PRIVET GREEN
SPANISH BLUE
NIGERIAN BLUE

ALSO WHITE

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

Specification No. 4

BUTEX VITAFUSED OIL PAINT

BUTEX is the only paint made entirely from Vitafused Oil, and is distinct from all other high grade paints. The development of Vitafused Oil sets a new standard in paints, giving vital and desirable properties unobtainable in any other product.

The production of Butex and its outstanding superiority over existing high grade paints was made possible only by the development of Vitafused Oil.

Vitafused Oil is the result of a unique processing of superdurable oils giving vital properties unobtainable in any other paint medium, quick drying and extended durability being outstanding features. The process includes a compensating reaction from its initial quick drying to an effective check against excessive oxidisation, the film remaining firm but elastic and highly resistant to the destructive action of sun and weather.

The drying of Butex does not depend upon the evaporation of solvents as in the case of quick drying enamels nor upon an over large of driers as is used in certain indoor paints but owes its quick drying to the properties of Vitafused Oil.

Though Butex dries in less than half the time the percentage of driers used is considerably less than half that allowed in recognised durable oil paints, a factor that contributes very largely to its greater durability.

The employment of Vitafused Oil also provides remarkably easier application and self levelling properties.

All the pigments used in the manufacture of Butex are the purest and best obtainable, and are carefully blended and balanced to give greater stability, plus maximum hiding or obliterating power. Butex will give a cover and finish in one coat that would be impossible to obtain with any other paint.

Butex permits a liberal addition of turpentine without any appreciable loss in cover or diminution of its rich finish. Even up to half a gallon of turpentine may be added to each gallon of certain colours. Full directions for thinning are printed on each can.

DRYING. [illegible]

SPREADING. [illegible]

COVER. [illegible]

APPLICATION. [illegible]

UNDERCOATS. [illegible] more than one. [illegible] Butex undercoat paints [illegible] very [illegible] results. These are obtainable in white and five colours, adequate for the full range of finishing colours. The finishing colours for which each colour of undercoat paint is intended is listed on each tin.

Specification No. 5

TAUBMANS RUSSOLENE FLAT OIL FINISH

(Colour Range is shown on Page 274)

A durable, washable and non-absorbent Flat Oil Finish for all interior surfaces—plastered walls and ceilings, metal ceilings, woodwork, wallboards, etc. Produces a delightful satin finish, preferable to dead flat, as it does not smear, mark or allow dirt to ingrain to the same extent and is far more washable. Its surface aids the correct diffusion of light and affords an excellent setting for good class furnishings. It flows out from the brush and levels to an even surface, showing no lap marks or brush marks. It can be scrubbed without injury to the finish and is therefore quite sanitary.

The covering and spreading properties of Russolene are well above the average—one gallon covering approximately 1,000 square feet.

Application: New Work. New plaster or cement walls must first be given one coat of Russolene Primer. The addition of a little Russolene to the Primer will assist the covering of the first coat. Do not use Glue Size or Linseed Oil. Any holes or cracks should first be dabbed with Primer then filled with putty made from Russolene and plaster of paris—not Linseed Oil. See that the surface to be coated is quite dry. Work with windows and doors closed, opening them immediately work is completed.

First Coat. Add Russolene Primer to the extent of 25 per cent. to 50 per cent., mixing thoroughly. Flow on and brush well out. Each coat requires at least 24 hours to dry before applying next coat.

Finishing Coat.—Apply undiluted, but if too heavy bodied for convenient working, thin by adding Turps until of such consistency that it flows easily and smoothly from the brush.

Old Plastered Walls.—If previously coated with Kalsomine, wash down and remove Kalsomine, then treat as new walls.

When recoating old flat-painted walls, use for first coat Russolene thinned with equal quantity of Russolene Primer.

Woodwork.—Follow directions given for Plaster, both new work and repainting.

METAL CEILINGS.

First Coat.—Add approximately 20 per cent. Russolene Primer.

Finishing Coat.—Apply undiluted.

Specification No. 6

TAUBMANS STAYWHITE—(THE SUPERIOR MILLWHITE)

Suitable for cement and plaster walls and ceilings, fibro cement, stucco, etc. Noted for its purity of white and dense covering properties. Supplied in paste form requiring only the addition of cold water. Where a sanitary finish of low cost is desired, particularly on factory walls, light areas, etc., Staywhite is unequalled. It dries to a matt finish, binds firmly to the surface so that it will not rub off, yet does not harden to the point of scaling. One cwt. will cover approximately 800 square yards on smooth surface.

Application. Staywhite may be brushed or sprayed. Two coats are necessary on new cement, etc., but on plaster ceilings, one coat is generally sufficient.

Interior Surfaces.—Thin with approximately three-quarters of its own bulk of water until it is of ordinary paint consistency or slightly thinner. Allow to thoroughly dry before applying second coat.

Exterior Work. Add one gallon Taubmans Binding Emulsion to each cwt. or alternatively, ½ to ¾ gallon Raw Linseed Oil to each cwt. Stir in well until thoroughly mixed before adding water.

WARNING. Surfaces that have previously been lime washed should be thoroughly cleaned down and as much of the old lime as possible removed. The presence of lime beneath the coating of Staywhite will weaken its binding properties, eventually causing it to rub and peel. On very absorbent surfaces too great a proportion of the binding constituents are absorbed into the surface, leaving the paint on the surface insufficiently bound. To obviate this trouble, a good wetting with water immediately prior to painting is advisable.

Specification No. 7

TAUBMANS ZOTENA WATER PAINTS

Zotena is really "Tinted Staywhite" and possesses the same qualities and characteristics for which Staywhite is noted. The colour pigments are thoroughly ground in during its manufacture, ensuring an even density of colour. The colour range consists of 24 tints of high decorative value. Colour books supplied on application.

Application.—Treat as Staywhite. (See Specification No. 6.) Special overbound quality suitable for outside brick, cement work, etc., is available.

(Continued on next page)

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RUSSOLENE
FLAT OIL WALL FINISH

See Specification No. 5—Page 273

FOR ALL INTERIOR SURFACES

WASHABLE AND NON-ABSORBENT

IVORY

SILVER GREY

CREAM

PALE GREEN

OYSTER GREY

DAFFODIL

APPLE GREEN

LILAC

BISCUIT

SKY BLUE

FRENCH GREY

CHAMPAGNE

POWDER BLUE

SHELL PINK

CINNAMON

SLATE

(Continued on next page)

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

TAUBMANS SOLPAH PRODUCTS

Specification No. 8

SOLPAH ROOF AND STRUCTURAL PAINTS

The most enduring protection for all exposed iron and steel structures particularly galvanized iron roofs, tanks, guttering, fences, fire escapes, bridges, etc "Solpah" resists rust, definitely prevents corrosion and successfully withstands all extremes of climatic exposure One coat covers well and gives years of service. It works easily, dries quickly, and reduces temperatures of roofs, particularly the light grey and white, and does not contaminate tank water. "Solpah" is supplied in a suitable range of colours Colour cards on application

Application.—Remove any scale or rust and see that the surface is clean. New galvanized iron work should be allowed to weather for about six to eight weeks before painting One coat is generally sufficient. Where two coats are to be applied use the paint straight from the can

Old Work.—Rmove all rust and loose or scaly paint and apply one coat

Specification No. 9

SOLPAH WEATHERPROOF OIL

Solpah Oil is a blend of weather-resisting oils, uniquely treated, that provides a tough elastic film of the utmost protective value. Practically colourless, it dries to a high-polish lustre that retains its gloss under exposure to sun and rain and immersion in salt or fresh water It preserves and beautifies outside woodwork, heightening the natural colour and grain of the timber, at the same time forming an impassable barrier to all causes of decay On brick walls it provides a glossy waterproof film that prevents penetration of the weather.

Application: Exterior Woodwork.—Clean the woodwork, sandpaper where necessary, and apply two coats. Brush on freely, spreading each coat out evenly It is advisable to allow two to three days between coats if convenient. Do not apply while the timber is damp or green

Brickwork.—Clean down and appl three coats Use a stiff, short-bristle brush for the first coat, and "punch into the pores of the brick Before applying second coat, putty all holes and cracks Second and final coats may be brushed on freely Allow at least 24 hours between coats—two to three days, if convenient

Interior Woodwork.—To accelerate drying, add ½ pint Taubmans Terebine to each gallon. Apply .. varnish.

Specification No. 10

SOLPAH PAVING PAINTS

Sun and weather proof, water proof and traffic-resisting, Solpah Paving Paint gives long service on cement paths, floors and steps, both indoors and outdoors It is more than a mere coating of colour, as it not only gives a smooth colourful evenness, but binds the cement surface, preventing it wearing into destructive gritty particles Though made specially for application on cement, it is satisfactory on almost all surfaces and many extra uses can be found for Solpah in every building and residence Being heat-resisting and easily cleaned, it is excellent for fireplaces and hearths.

It is not advisable to use Solpah on floor tiles owing to the lack of porosity to form a key for the paint to adhere

Used on roofing tiles, it prevents leaking and vegetating and, in addition, provides colour effects not obtainable in pottery.

Solpah is supplied in White, Black, Ferric Red, Dark Red, Slate Grey, Silver Grey, Lino Brown, Cream and Green. Colour cards on application.

Application.—Solpah Paving Paint is not intended for use on new cement and sufficient time should be allowed for the cement to age This time varies according to conditions, but usually six to eight weeks is sufficient See that the surface is thoroughly dry and free from dirt and grease Apply two coats, brushing out evenly On indoor surfaces, allow two days for first coat to harden. Outdoors, 24 hours is sufficient

Use undiluted, but should thinning be required, use only pure Turps

Specification No. 11

TAUBMANS SILVAFROS

Silvafros is distinct from all other Aluminium Paints or Enamels owing to the special blend of oils which forms its medium This medium gives to Silvafros an extra brightness, longer length of service and greater resistance to heat and weather exposure. It positively prevents rust, does not tarnish, and is unrivalled as a durable, bright silvery finish for all surfaces. The light reflective properties of Silvafros, together with the fact that dirt and dust can be easily washed from its surface, make it an ideal coating for interior walls and ceilings of workrooms and factories. On petrol storage tanks, in addition to preventing rust and corrosion, it reflects the sun's heat instead of absorbing it and so lessens the evaporation of the contents. Silvafros has been extensively used for this purpose by various oil companies

Silvafros gives much greater coverage than ordinary paints, due to the tiny flakes of aluminium flattening out and inter-leafing when being applied For this reason it is most satisfactory in preventing "bleeding through" of bituminous factory finishes on pipes and as a priming coat on metal surfaces that are to be enamelled or otherwise coated.

Silvafros excels in salt air resistance, retaining full brilliance over years on launch and yacht parts

One coat covers exceptionally and is effective even over black.

Application.—Remove any rust, scale or loose paint (if old painted surface) and see that the surface is clean and dry. Brush out to a uniform coat.

(Continued on next page

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Specification No. 12

TAUBMANS GLOMA ENAMEL

Gloma is the superlative of White Enamels. It is outstanding in its purity of whiteness, beauty of lustre and long-wearing properties It remains unaffected by steam, hot water, and extremes of heat and cold, and will not turn yellow Gloma is scientifically compounded to produce a film that dries hard, yet remains elastic This has been demonstrated by coating a piece of pliable tin with Gloma and, when dry, bending the tin double and then straightening it without in any way injuring the enamel film. The surface of Gloma may be regularly washed without injury, even with a weak solution of disinfectant, and is eminently suitable for walls, etc., of factories engaged in the preparation of foodstuffs, refrigerator rooms, hospital operating theatres, bathrooms, lavatories, etc.

Gloma may be specified with full confidence as producing the very highest grade results in enamelling

APPLICATION.

WOODWORK.—Sandpaper to smoothness and, if Redwood, treat with lime water.

First Coat.—"Tradex" thinned as for first coating (see Specification No. 2).

Second Coat.—"Tradex" thinned as for second coating (see Specification No. 2).

Putty all holes, etc., before applying.

Third Coat.—Gloma White Undercoating

Finishing Coat.—Gloma Enamel applied straight from the can Should the enamel require thinning through any reason, add only special Gloma Thinners, or pure Turpentine

OLD WORK.—Remove all loose particles, sandpaper to smoothness, dust off and treat with lime water Follow directions given for new work with these exceptions. (a) If previously white and in clean condition, omit first and second coats; (b) If old paint work is marked and faulty in any way, omit first coat only.

Where burning off has been necessary, treat entirely as new work.

NEW PLASTER.

Prime Coat.—Soipah Oil thinned by the addition of approximately 10 per cent. pure Turps.

First Coat.—"Tradex" thinned as for second coat (see Specification No. 2).

Second Coat.—Same as first coat

Third Coat.—Gloma White Undercoating.

Finishing Coat.—Gloma Enamel applied straight from the can. Should the enamel through any reason require thinning, add only special Gloma Thinners

METAL SURFACES.—Remove all rust or scale and clean thoroughly

First Coat. Taubmans Silvafros.

Second Coat. Gloma Undercoating

Finishing Coat.—Gloma Enamel (undiluted)

Specification No. 13

PEARLINE ENAMELS

Pearline Enamels possess the same characteristics as Gloma Enamel (see Specification No. 12) and are supplied in a range of 36 colours, which may be mixed together in varying proportions giving almost any shade desired.

A range of Undercoats adequate for the full range of Pearline Enamels are obtainable and these are listed, together with the colours of Enamel for which they are intended on the colour cards Colour cards on request

Application.—Follow directions given for Gloma Enamel (Specification No. 12), using the special Undercoatings as mentioned above

Specification No. 14

TAUBMANS PENETROL STAINS

Clear, full-toned stains, not containing Tar or Creosote, but based on firm-drying, non-resinous oils that preserve the timber.

Penetrol enriches the natural beauty and grain by penetrating into the surface and placing the transparent stain colours right into the wood, retaining and enhancing its texture and adding a depth and dignity unequalled by any other treatment. This penetration is a feature much appreciated by tradesmen, as it permits sandpapering without lightening or causing unevenness of the tone.

Penetrol Stains are available in 13 tones, and may be inter-blended or reduced with pure Turps.

Application.—Apply freely with a brush, working each brushful well into the timber. No wiping off is necessary. Allow 24 hours to dry and harden before varnishing or lacquering.

Finishing. -Where Eggshell Gloss or Eggshell Flat Finish is desired, first apply a full coat of Taubmans Hard Drying Oak Varnish. This supplies body and depth and adds greatly to the durability of the finish.

Lacquering.—The polish-lustre finish so much in modern demand is quickly and conveniently obtained by applying one or two coats Fascinac Clear Lacquer, either by brush or spray

One coat gives a subdued, clear lustre, is very quickly applied, and exceptionally hard-wearing, presenting that tough, tack-free hardness inherent to good quality Nitro Cellulose Lacquer.

Two coats fill the grain better, increase the lustre and provide longer service. The first coat dries in 10 minutes and the second coat may be applied an hour after

Specification No. 15

TAUBMANS VARNISHES

The range of Varnishes we manufacture is a most comprehensive one and completely covers every requirement. We cannot, in these pages, enumerate each special varnish and grade of varnish, and we are describing those only that are in general use for the purposes for which they are specified

Application.—To obtain best results always avoid applying varnish when the atmosphere is damp or foggy, and cease work a couple of hours before nightfall See that the surface to be varnished is clean and dry and free from grease. Whenever there is a probability of grease, first treat the surface with lime water. Brush out to an even coat

Taubmans "All Service" Oak. "All Service" is the highest grade "Oak" Varnish, excels in durability and lustre and is suitable for both exterior and interior work.

Taubmans Decorators' Exterior Copal. A high-grade, full lustre varnish, particularly durable on exposed surfaces Recommended for highest class work and where resistance against weather exposure is essential.

Taubmans Fine Pale Copal.—Richness of lustre and elasticity are outstanding features of this varnish, and we strongly recommend it for the best class of interior work

Taubmans Hard Drying Carriage.—A particularly durable varnish for all interior work where hard wear is to be contended with.

Taubmans Hard Drying Oak. -A full-bodied varnish for interior and sheltered surfaces. Thoroughly dependable and universally used for all general work.

Taubmans Eggshell Flat. -A perfectly balanced wax finish for flat varnishing and all interior stain work. Both Eggshell Flat and Eggshell Gloss (described below) provide a finish only and do not by themselves form a protective coating. It is advisable to "body up" by first coating with Taubmans Hard Drying Oak Varnish (see Specification No 14).

Taubmans Eggshell Gloss. Similar to Eggshell Flat, excepting that it dries with a pleasing sheen and is an alternative finish for stain work where a high gloss or true Eggshell Flat is not desired.

(Continued on next page)

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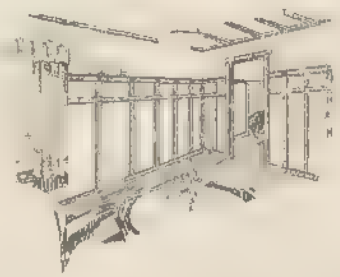
Specification No. 16

CELOTEX AND INSULATING BOARDS

Extreme porosity excludes these materials from general painting specifications. When merely coloured, its rough surface is, under certain conditions, quite pleasing If this effect is suitable, Zotena Water Paints (colours) or Staywhite (White only) will produce the desired result and prove satisfactory. Two coats are necessary to obtain evenness of colour.



Should a coating or film be considered advisable to waterproof or otherwise protect the surface, or should the decorative effect require a paint or enamel finish, we advise the following procedure

In every case, whether the finish is to be Gloss Paint, Flat Oil Paint or Enamel, a priming coat is necessary For this purpose, a coat of Taubmans Staywhite will prove most effective in stopping the pores and preparing the surface for the first coat

WHEN GLOSS PAINT FINISH IS REQUIRED:

Priming Coat.—Taubmans Staywhite thinned with water to usual paint consistency.

The choice of three products is given: "Tradex," Trade Service White or Service Paints

"Tradex." Follow instructions for first, second and finishing coats on new work given in Specification No. 2, adding extra oil in first coat.

Trade Service White.—Thin as instructed for new work given on the container; apply three coats.

Service Paints: First Coat. Service Undercoating Paint, adding one pint Raw Linseed Oil to each gallon.

Second Coat.—Service Undercoating Paint, straight from the can

Finishing Coat. — Service Paint straight from the can

WHEN FLAT OIL FINISH IS REQUIRED:

First Coat. Same as for Gloss Paint Finish.

Second Coat.—Russolene Primer.

Third Coat.—Equal parts Russolene and Primer

Finishing Coat. Russolene straight from the can or thinned with pure Turps, if necessary, for easy working

WHEN ENAMEL FINISH IS REQUIRED:

First and Second Coats:—Same as for Gloss Paint Finish.

Third Coat.—Gloma Undercoating or Pearline Undercoating respectively, according to whether white or colours are required

High Gloss Enamel gives a very pleasing effect on the rippled uneven texture of Celotex

Specification No. 17

TAUBMANS FASCINAC LACQUERS

Fascinac Lacquers are obtainable in Clear and Colours and for application by brush or spray gun. Though there has been a tremendous growth in the use of the brushing quality of Fascinac Lacquers, the spraying method of application is strongly advocated where large surfaces are to be coated. The range of Fascinac Lacquers include the following finishes:—

Clear.—Clear Polishing, a feature of which is the ease with which it speedily polishes to a high lustre.

Full Flat, and Semi-Gloss.—These finishes obtained direct from the spray

Clear Floor Lacquer.—A most pleasing finish of great depth that accentuates the natural colour and grain beauty of the timber.

Colours.—Semi-Gloss and Full Gloss (direct from the spray)

In addition to the convenience of quick drying, Fascinac Lacquers possess many valuable properties that make them definitely superior to other types of finishes.

The surface of Fascinac has a richness peculiar to itself and is highly resistant to heat and moisture. It is harder and less liable to scratch or mark, and does not collect dirt as rapidly as other finishes, and less frequent cleaning is necessary When the surface does need to be cleaned, it may be washed with soap and water without harmful effect upon the finish Being practically impervious to steam, hot water and soap, it is ideal for kitchens, bathrooms, lavatories, etc.

Another feature of Fascinac Lacquers (particularly the Clear) is the ability to repair some local damage without showing a patchy effect. The new coat softens the old lacquer and amalgamates with it so that the newly applied portion is practically not noticeable. This is particularly valuable when reconditioning worn parts of floors, such as at doorways where the wear is excessive.

Specification No. 18

TAUBMANS RIVERLAC FLEXIBLE LACQUER

Riverlac has been perfected to fill the need of a decorative finish and protection on wicker, cane and seagrass furniture, leather and fabric seats and upholstery and any surface where flexibility of the coating is necessary

Riverlac remains pliable and grips the surface more tenaciously than other lacquers and will not peel, crack nor chip. It is waterproof and its resistance to weather and hard usage is greater and it is strongly recommended to be specified on all exposed woodwork and ironwork

Riverlac possesses all the desirable properties of Fascinac and other lacquers, with the advantages of flexibility and longer durability under weather exposure

A feature of Riverlac is its free-flowing and self-levelling properties, making it easy to apply by brush and low pressure spray guns.

Colours.—Riverlac is obtainable in a full range of colours, and any desired shade not included in the regular range may be easily obtained by mixing two or more colours in various proportions.

(Continued on next page)

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RAMSAY'S ARCHITECTURAL AND ENGINEERING SPECIFICATIONS

The Authoritative Australian Specification Manual

containing over

3,000 distinct paragraphs for the building up of your office standard specifications.

25 short form specifications—suitable for descriptions of proposed work.

Many pages devoted to the actual work of assembling specification data, and the presentation of contract specifications, and much other useful matter for the specification writer.

This Manual represents two years' work in the collection, writing and editing of architectural and engineering specifications from every available source of this material in Australia.

SEE THE CLOSING PAGES OF THIS CATALOGUE FOR FURTHER INFORMATION

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

HARDIE TRADING PTY. LTD.

Manufacturers of Lacquers, Enamels, Varnishes, Etc.

581 LITTLE COLLINS STREET, MELBOURNE

25

S.A.A. File No

DISTRIBUTORS:

VICTORIA—Hardie Trading Pty Ltd., 581 Little Collins Street, Melbourne; McPhersons Pty. Ltd 582 Collins Street, Melbourne Brooklands Accessories Pty Ltd, 150 Lonsdale Street, Melbourne, Hawkes Bros. Pty. Ltd., Clare St., Geelong

NEW SOUTH WALES—Spartan Lacquers Ltd, Solar House, 266 Elizabeth St., Sydney; James Sandy & Co Ltd., 268 270 George St, Sydney, Bennett & Barkell Ltd., Meagher St., Sydney, Gray Shedden & Co Ltd., 19 Merewether St., Newcastle.

WESTERN AUSTRALIA—C. H Goddard & Co., 18 Howard Street, Perth; McPhersons Pty. Ltd., 532 Murray Street Perth.

QUEENSLAND—James Hardie Trading Co. Ltd., Perry's Buildings, Elizabeth Street, Brisbane, Jas. D. Sloan & Co., 95 Adelaide Street, Brisbane.

SOUTH AUSTRALIA—Hardie Trading Pty. Ltd., South Road, Mile End South; Thompson & Harvey, 111-117 Flinders St., Adelaide

TASMANIA F. H. Stephens Pty. Ltd., 41 St. John St., Launceston; P C Abbott, 117 Macquarie St., Hobart.

Trade Mark

Production

The whole production of the Spartan factory is based on the latest methods, machinery, and formulae

For years past we have maintained an overseas connection which is in constant touch with the latest developments in the field of Lacquer, Varnish and Enamel research carried out in other parts of the world.

Service

As the application of lacquers in many directions is comparatively new, the services of experts in each State of the Commonwealth are available to users.

Stocks of all lines are carried in the chief centres of Australia

Spartan Pigmented Lacquers

This range comprises lacquers in a great variety of colours designed in different ways to suit exterior conditions as with motor cars, or interior decoration, ironwork, etc., etc. Care in selecting the lacquer for the particular work is necessary, and enquiry from the makers is recommended.

Clear Lacquers

Clear Lacquers represent the latest development in wood finishing, and in recent years have displaced French polishing for high-grade work. Not only is the cost lower, but the system gives many advantages in appearance and durability

Sanding Sealer

Sanding Sealer, which is really a transparent filling material, replaces shellac and is much superior in its adhesive qualities, forming the ideal bond between the wood and lacquer

Wood Stains

Spartan Wood Stains are made in blackwood, mahogany, walnut, rosewood, light and dark oak, and Jacobean They have remarkable penetration, so are not susceptible to rubbing off in the application of the filler. They are unusually free from bleeding, and at the same time are as permanent as it is possible to manufacture wood stains They do not raise the grain, and dry very rapidly

Fillers

These heavy paste fillers have proved the most economical line on the market, because they do not embody Barytes and such like heavy loading materials

They are exceedingly fine in texture and accordingly call for a minimum of sanding before the application of the sealer coat.

Spartan Quick-Drying Enamel

This is a line developed quite recently from synthetic resins in combination with special varnish oils, producing an enamel which is extremely hard and durable as well as quick drying. These enamels are so designed that they will spray, brush, or dip with equally good results, while they may be used for either inside or outside purposes, and on both wood and metal. They will be found in practice to give very good results as a floor finish. For spraying it is recommended that they should be thinned with mineral turpentine, two parts of enamel to one of the thinning agent. For brushing no addition of the Thinner is necessary, as they are made ready for use. They will flow easily and level out to a glass like finish free from brush marks For dipping, the line is used as made, and will give an extraordinarily high gloss.

TYPICAL FINISHING SCHEDULES

1 ARCHITECTURAL WOODWORK, FURNITURE, ETC.
(Clear Finishes)

Stain with Spartan Wood Stain to the desired colour; fill with Spartan Wood Filler, supplied in pulp form and to be thinned as necessary with Spartan Mineral Turps; dry six hours, sand lightly (For all finishes, and then as follows):

a. HIGH GRADE GLOSS OR PIANO FINISH.
Spray two coats Spartan Sanding Sealer 1364, allowing 30 minutes between coats, dry three hours or over night if possible, dry sand to a perfect surface. Spray two coats Spartan Clear Gloss 1128, thinned one part of lacquer to two of Spartan Thinner 236, dry over-night, pull over to piano finish with Spartan Bodying Liquid 320.

b HIGH GRADE FLAT OR VELVET FINISHES.
Spray two coats Spartan Sanding Sealer 1364, allowing 30 minutes between coats; dry three hours or over-night if possible, dry sand to a perfect surface Spray two coats Spartan 1156 (for Flat) or 1107 (for velvet finish), thinned one part of lacquer to two of Spartan Thinner 236.

c. SEMI-GLOSS FINISHES.
These finishes are obtained by mixing Spartan Clear Gloss 1128 with the Flat Lacquer, according to the lustre required.

d. FULL GLOSS FOR CHEAPER WORK
Spray one coat Spartan Sanding Sealer 1364, allow to dry three hours or over night if possible, dry sand to a perfect surface. Spray two coats Spartan Velvet Flat 1113, thinned one part lacquer to one part Spartan Thinner 236. night; pull over to high gloss with Spartan Bodying Liquid 320.

e. FLAT FINISH FOR CHEAPER WORK
Spray one coat Spartan Sanding Sealer 1364; allow to dry three hours or over-night if possible; dry sand to a perfect surface. Spray two coats Spartan Velvet Flat 1113, thinned one part lacquer to one part Spartan Thinner 236.

2 ARCHITECTURAL WOODWORK, FURNITURE, ETC.
(Industrial Lacquer Finishes)

After sanding, apply one or more coats of Spartan Whitewood Undercoat 1307 depending on the condition of the surface Allow to dry for two hours or longer if possible, and dry sand. Apply two coats Spartan Industrial Lacquer of the desired colour, thinned with equal volume of Spartan Thinner 236 or 244. The result is a full gloss finish, but if desired a semi-flat or flat finish can be obtained by replacing the Spartan Industrial Lacquers with our Flat or Eggshell Lacquers.

3. ON METALS

Clean surface with Spartan Cleaning Solvent 663 and fill as necessary with Spartan Oil Glazing Putty 4328. Allow to dry for six hours, and apply one or more light coats of lacquer Primer Surfacer 1301 (white) or 1303 (grey).
Allow to dry for one hour and sand, using petrol as a lubricant. Apply two coats of Spartan Industrial Lacquer of the desired colour.
N.B.—It should be carefully noted that where such metal work is exposed to the weather, Industrial Lacquers which are susceptible to the rays of the sun should not be used. The only line suitable is Spartan Automobile Lacquer

4 ON PLASTER WALLS.

Remove any old finish which shows lack of adhesion, and apply a very light coat of Spartan Priming Oil 4305; allow to dry over-night, and apply one or more coats as necessary of Spartan Flat Wall Lacquer. This schedule gives a flat, washable finish, specially suitable for hospital wards, kitchens and the like. Spartan Industrial Lacquer will give a gloss.

5. BRONZE FINISHES

For best results apply one or two coats of Spartan Lacquer Primer Surfacer 1303, allow to dry for one hour and finish with one coat Spartan Bronzing Liquid 11245, to which is added the Bronze Powder of the desired colour. Then apply one coat of Spartan Bronzing Liquid 11245 Clear.
This Bronzing Liquid is so designed that under normal conditions the Bronze Powder will not cause the liquid to thicken or "jell" after making up.

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25 S.A.A. File No.	WEST COAST KALSOMINE CO. (Australia) LTD. PARRAMATTA, N.S.W.	"WESCO"

Wesco Kalsomine

WESCO Kalsomine is rightly called "the perfect wall finish" and, during the many years it has been before the Australian public, has established a reputation for high quality and uniformity

Wesco Kalsomine is compounded from the finest and purest raw materials, and is manufactured under the direct supervision of experts in this line The results obtained by its use in the decoration of interiors are unsurpassed in beauty and delicacy of effect.

Wesco Kalsomine spreads easily, flows freely and covers completely in one coat, thus making it an easy vehicle to use. It assures the most satisfactory results for most intricate and artistic work as well as for plain tinting

It is non-poisonous, does not decay or rub off like ordinary kalsomine, and can be washed off when desired.

Wesco Kalsomine can be mixed with hot or warm water if desired

Suggestions for Preparatory Work.—Wash off all dirt and old Kalsomine from the surface to be coated Cut out and fill all cracks, nail holes, etc., with WESCO Patching Plaster. Sandpaper the rough places and ridges to get a smooth and even surface. The surfaces should be sized with WESCO Wall Size, and then allowed to dry thoroughly before kalsomining.

Durablo Cold Water Paint

Durablo is a dependable paint in dry powder form, and is ready for use when mixed with cold water

Carefully selected raw materials, scientifically processed and milled, go to make DURABLO a most economical, sanitary, weatherproof and durable paint, which will adequately protect the surfaces of all manner of buildings against sun, rain and wind.

Durablo is a substitute for oil paint at a fraction of the cost It is suitable for painting wood, brick, cement, concrete, iron, fibro and asbestos sheeting or any surface that is solid and not in a crumbling condition.

Durablo is a fire retardant and has been the means of saving valuable fencing in districts swept by bush fires. It contains no white lead or zinc and consequently does not turn yellow with age

A five-pound packet of DURABLO will make sufficient paint to cover from 100 to 400 square feet according to the surface to which it is applied.

Wesco Wall Size

When mixed with boiling water, WESCO WALL SIZE forms an elastic, transparent liquid which spreads perfectly and dries quickly

WESCO WALL SIZE stops all suction and prevents stains coming through kalsomine or paper It will positively prevent "hot" spots from discolouring the most delicate kalsomine tints

For Kalsomine and Flat Oil Paints—use one coat of Wesco Wall size Where "hot" spots are indicated when sizing, apply a second coat. When thoroughly dry apply a finishing coat of kalsomine or paint

For Oil Paint—use one coat of size. When dry apply a coat of paint, thinned with turpentine When dry apply a finishing coat of paint

For Wall paper Hanging. A coat of Wesco Wall size ensures a perfect job under all conditions

A one-pound packet mixes a gallon of liquid Wesco Wall Size.

Wesco Patching Plaster

This plaster is manufactured from a special formula and is intended for use in filling nail holes and cracks in walls and ceilings, so that there will be no indication of their presence when the surface has been kalsomined

WESCO Patching Plaster merely has to be mixed with cold water, and for small cracks it can be mixed to a thin paste and applied with a brush It sets slowly like ready mortar and will not shrink, crack or crumble. It will not "spot through" when paint or kalsomine is applied over it. It contains no chemicals.

Velduro Mill White

This is prepared in paste form, for use on exterior or interior surfaces where a clean and brilliant white effect is required. It can be relied upon to produce a durable and velvety finish that will neither rub off nor lose its intense white tone.

Directions for use.—For interior work, simply stir in sufficient cold water to form a paint of thick, creamy consistency. Do not mix too thinly.

For exterior work, stir in about a pint of raw linseed oil to 28 lbs. of Velduro Mill White (in its original paste form) and then thin down with cold water as above described Make certain the surface to be painted is clean and free from old paint, distemper, etc.

Wesco Poster and Fresco Colours

These colours are manufactured from selected materials, scientifically compounded in dry powder form Being properly sized, they only require mixing with water to prepare them for immediate use

For Interior Decoration.—Where rich, solid and deep effects are desired, these colours can be applied on plaster walls, wood, stone or any wall boards. They are indispensable for use with stencils for friezes, dados, etc., and also as a medium for the WESCOPAL process. The colours can be broken down with White, and can be used with Wesco Kalsomine with which they mix freely.

For Posters, Commercial Art, etc.—The colours are admirably suited for the production of Posters Frescoes, Signs, Showcards and other Commercial Art uses; also for general use in Art Schools and Technical Colleges

Wesco Glazing Putty

Wesco Glazing Putty is a compound of best quality whiting and a blending of English Pure Raw Linseed Oil Before release from the factory it is thoroughly matured It does not settle and needs no reworking before glazing. It runs freely under the knife and once glazed does not shift.

Butler's Steel Sash Putty

Butler's Steel Sash Putty is specially prepared for use on steel sashes where it is essential that the medium must not skin and must dry from the inside out, there being no absorption in the sash itself After glazing, it becomes thumb hard within a few days under the most extreme climatic conditions There is no faster-glazing putty than this. Made in every colour to order.

That both of these putties are the standard of the most important glazing companies in Australia is their highest commendation.

Wesco Bonding Cement Paint

Wesco Bonding Cement Paint is an artificial stone in powder form, which actually "bonds" with the surface and sets like cement. It depends for its binding and waterproofing qualities on its penetration of the surface, and must therefore have a fairly porous surface which it can penetrate and bond with. An easy test to determine whether the surface has enough porosity or suction, is made by throwing water on the surface. If the water runs off quickly, the surface is not suitable. If, however, the water is quickly absorbed without running off, there is enough suction for Bonding Cement Paint.

Bonding Cement Paint is a Wall Paint designed primarily for use on UNPAINTED Cement, Stucco, Brick, Tile, Concrete, Stone or other masonry surfaces, and it is not suitable for use on floors, sidewalks, etc It should NOT be used on wood, iron, or any surface which has previously been painted with oil paint or with cold water paint. If the stucco or cement surface has previously been coated with a cheap "brush coat" or water paint, it is usually easy to remove the old coat and restore the surface to its original condition, thus making it suitable for the application of Bonding Cement Paint Renewal coats of Bonding Cement Paint may be applied as time requires.

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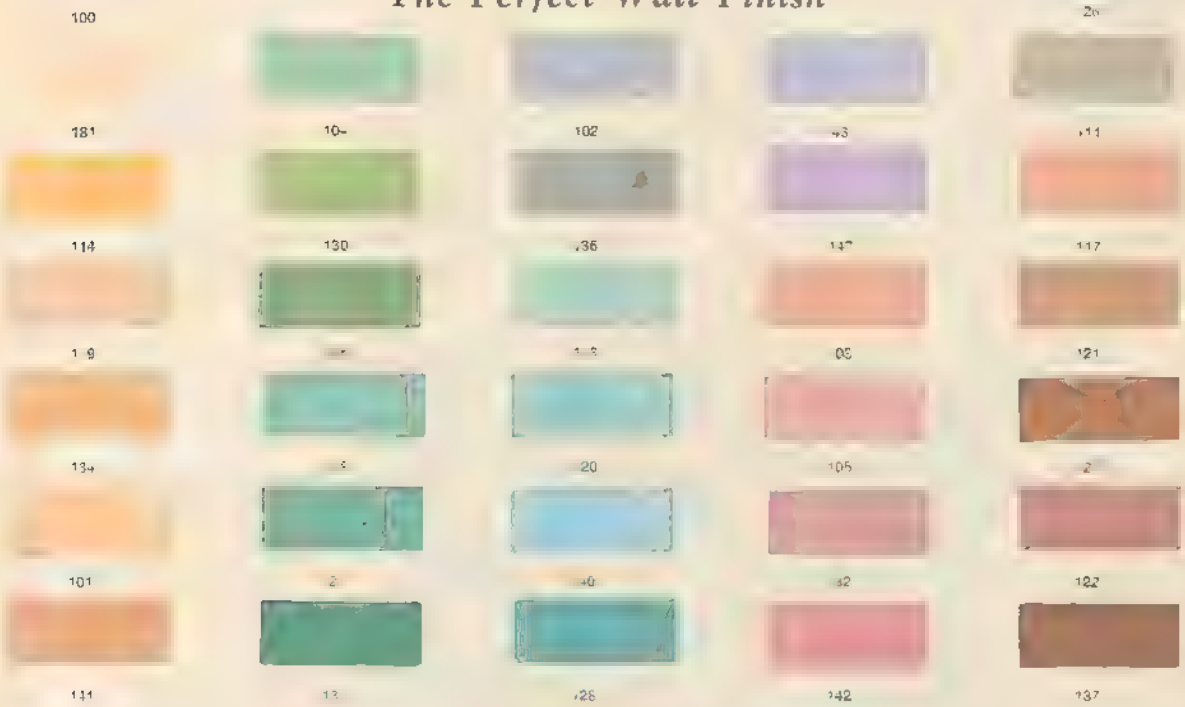
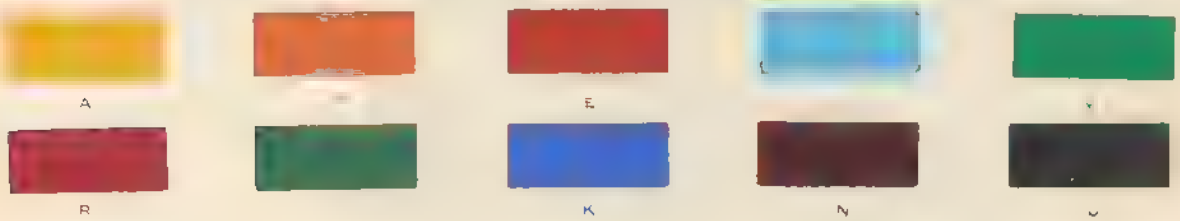
WESCO KALSOMINE

The Perfect Wall Finish



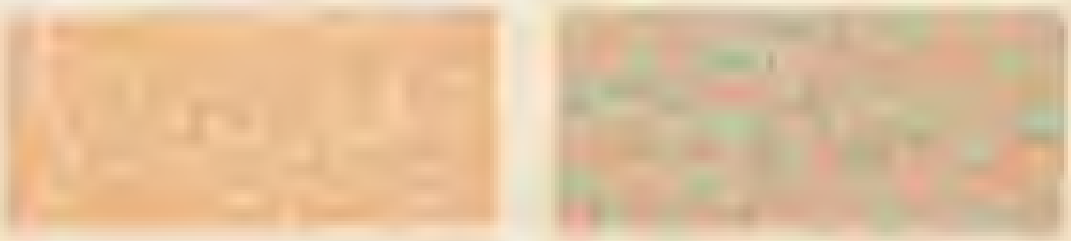
ALSO IN WHITE

WESCO POSTER and FRESCO COLOURS



WESCOPAL PROCESS

Wescopal is an ideal process for obtaining any particular combination of colour tints of WESCO Kalsomine in a very economical and simple way. On any chosen background of WESCO Kalsomine one or more different broken tints are applied by use of a sponge. The best results are obtained by using the patented WESCOPAL Sponge. The sample book of colour combinations gives the best idea of the infinite possibilities of this beautiful treatment for interiors. Write to WEST COAST KALSOMINE CO. (AUST.) LTD. for a copy of the book.



From the collections of Sydney Living Museums / Historic Houses Trust of NSW

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"CROWN" WALL-PAPERS

THE WALL PAPER MANUFACTURERS LIMITED

125 HIGH HOLBORN, LONDON, W.C.1
ENGLAND

28c

S.A.A File No

Products

High-grade English made wallpapers in a very wide range of plain and figured effects. "Lincrusta," "Anaglypta," and "Lignomur" relief decorations. Washable or "sanitary" wall and ceiling coverings.

Trade Mark

Every roll of wallpaper produced at the mills of The Wall Paper Manufacturers Ltd. is distinguishable by the "Crown" which appears on the selvedge.

The Wall Paper Manufacturers Ltd. are the world's largest manufacturers of wallpapers. The "Crown" is your guarantee that you are obtaining wallpapers produced by the finest designers in the world.

Value in Architectural Design

The great architects of the past not only created their buildings, but also had charge of their decoration. Nowadays decorators can carry through the original theme of the architect by choosing from the infinite variety of wallpapers obtainable. "Crown" wallpapers are made in every grade of colour, line and texture, and so lend themselves to the perfect finishing of each room in every type of building.

The harmony of carpets, curtains, furniture coverings, etc., with the walls can be easily effected through the medium of well chosen "Crown" wall papers.

Advantages of "CROWN" Wallpapers

Decorative. Walls play a very large part in the decorative effect of a room. The walls have to tone and harmonise with the carpet, curtains, furniture coverings and everything of colour that is in the room. This can most easily be done through the medium of well-chosen wallpapers, and after the wallpaper has been selected, the required effect can be given to the ceiling as well as by the use of a modern ceiling covering.

Modern. Admirers of modernistic decoration are well provided for by "Crown" wallpapers. There are geometric designs, plain colours and simple or sharp contrasts, all in correct colour-harmony, and emphasising the simplicity that is the keynote of modern art.

Progressive. — The Wall Paper Manufacturers Ltd. have a staff of experts who are fully competent to create new ideas in designs and colour-schemes.

Adaptable. Wallpaper is capable of suiting itself to any room, temperament or purse. By means of carefully-chosen wallpapers, attention can be subconsciously directed where desired and the apparent size of a room can be altered.

Durable. Wallpaper serves the purpose of protecting the plaster of walls. It is far more hard-wearing than any other wall-covering.

Economical. The art of the leading colourists and designers can be imported into a home at minimum cost in the form of wallpapers. It is the greatest value-for-money item in the furnishing trade.

(Continued on next page

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"Crown" wall papers lend themselves to the perfect furnishing of all types of rooms, and it is easy to visualise the finished effect

Advantages of "CROWN" Wallpapers—(contd.)

Hygienic.—By remaining always dry, wallpaper is practically germ proof, because germs only thrive in a damp place. Many of the "Crown" wallpapers are washable; and both plain and varnished papers can be wiped with a damp cloth.

Transforming Power.—Wallpapers are undoubtedly able to effect a complete transformation of "atmosphere." This is shown by the fact that a large hospital in America has recently been papered throughout the wards to introduce cheerfulness. Wallpapers also play a great part in making hotel bedrooms "homelike."

SPECIFICATION FOR PAPERHANGING

MATERIALS

Only fresh paste of the best quality should be used for paperhanging.

All papers shall be "Crown" English wallpapers, and the architect shall be consulted regarding the designs.

WORKMANSHIP

Papers shall be hung true to pattern and be well dressed into all corners and angles. All borders in panelling shall be carefully mitred to avoid mutilation of the pattern. Prominent patterns shall be centred at the chimney breast and corners of the room. If any air blisters are visible, the walls shall be stripped and re-papered.

SCHEDULE

Note. If walls have [illegible] new plaster [illegible] or [illegible] treated [illegible] the action [illegible]

Walls [illegible] in gypsum or "Hardwall" plaster may be papered soon after drying out.

In all cases it is advisable that both walls and ceilings should be sized before papers are hung.

Set out in Schedule (1) the apartment, (2) wallpaper at a P.C. amount of [illegible] per roll or piece, and (3) frieze at P.C. amount of ..... per yard.

CROWN TRADE MARK WALLPAPERS

Shows "Lincrusta" which takes the place of oak for panelling and cannot be distinguished from same.

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SECTION L

[Containing S.A.A. Filing Section Nos. 21 and 23a

TILES
—and—
PLASTERING

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

23 a S.A.A. File No.	WM. CROSBY & CO. PTY. LTD. 488 COLLINS STREET, MELBOURNE VICTORIA *English Wall Tiles and Flooring*	23 a S.A.A. File No.

CLASSIFICATION OF TILES IN GENERAL USE

Position	Kind of Tile	Thickness	Shape and Size in Inches	Surface Finish	Colours	Remarks
WALL	WALL TILING	¼in. and ⅜in.	9 x 6		Super-white only	Manufactured in 3 grades Best Commercial Second (Commercial grade in general use)
		White and Cream invariably ⅜in.	6 x 6, 6 x 3, 4 x 4, 3 x 3	Bright Glazed Matt Glazed Antique Surface	White, ivory cream or enamels (coloured)	
	FITTINGS	Ditto	Plain cappings—6 x 1, 6 x 2, 6 x 3, 6 x 4 Coves—6 x 3, 6 x 4 Cove bases—6 x 6, 6 x 2 Moulded cappings—6 x 1, 6 x 1½, 6 x 2, 6 x 3 Rounded edge (1 or 2 edges rounded), 4 x 4, 6 x 3, 6 x 6, (and other miscellaneous fittings) Bonded angles—3 x 3, 6 x 3, each by 1, 1¼, and 1½ radii (1in. radius most generally used) Angle beads—6 x 1½, 2 or 3 radii, internal and external	Ditto	Ditto	All radii for external and internal angles are 1½in.
	FAIENCE	1in. (Overall depth into walls from surface of tiles).	24 x 12 12 x 12 (or other special sizes)	Moulded or ornamental, in a wide variety of artistic finishes and shades		
	BATHROOM FITTINGS (Recessed)	3in.	Soapholders—6 x 3, 6 x 6, 8 x 4	Glazed to match wall tiling	White, ivory and all pastel shades, in both bright and dull glazes	These fittings are recessed into the wall of which they actually form an integral part. Semi-recessed fittings are also available
		3¾in.	Ditto—12 x 6			
		3in.	Soapholders with hand grip—6 x 6, 8 x 4, 12 x 6			
		3¾in. and 3½in.	Ditto—12 x 6			
		1⅞in.	Hand grip only—6 x 3			
		3⅛in.	Toilet Paper Holder, 6 x 6, also 8 x 4 in flush mounting			
		1⅞in.	Toothbrush Holder—4 x 4, 6 x 3, 9 x 3			
		⅞in.	Hooks, Tumbler Holder and Shelf Brackets—3 x 3			
FLOOR	PAVING TILE	(Thickness) 1in.	6 x 6	Unglazed	Red, chocolate gray, buff, black and standard shades	
		⅞in.	6 x 6, 6 x 3, 4¼ x 4¼			
		¾in.	6 x 6, 6 x 3, 6 x 2, 6 x 1½, 6 x 1, 4¼ x 4¼, 4 x 4, 3 x 3 (squares or hexagons, also octagons)	Vitreous unglazed		
	CERAMIC MOSAIC	⅜in.	1 x 1 hexagon ¾ x ¾ and ½ x ½ squares, also Moravian, 2 x 1	Unglazed	Plain or colour (all shades)	
	QUARRY TILE	1in.	12 x 12, 10 x 10, 9 x 9 6 x 6 square	Unglazed	Red, brown, buff	
MISCELLANEOUS	TILED SWIMMING POOLS		Scum troughs or gutters in 1 ft. lengths			
	STAIRS		Stair treads and risers in non-slip vitreous surfaces			
	FIREPLACES					

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STUCCO

THE AUSTRALIAN CEMENT MANUFACTURERS' ASSOCIATION

HEAD OFFICE: YORKSHIRE HOUSE, SPRING STREET, SYDNEY

BRANCH OFFICE: TEMPLE COURT, COLLINS STREET, MELBOURNE

21 d

S A A File No.

PORTLAND CEMENT STUCCO

Bases for Portland Cement Stucco

Success in the application of Portland Cement Stucco requires that it be used either (1) as a material that is bonded to and becomes an integral part of the base to which it is applied, such as stucco on masonry, or (2) as a thin reinforced concrete slab anchored to the structure but not itself forming an integral part of the backing. An example of the latter is stucco applied on metal reinforcement over frame structures.

Monolithic Concrete

Monolithic Concrete Walls that have coarse or roughened surfaces are suitable bases for direct application of Portland Cement Stucco When the surfaces are not rough enough to provide anchorage, it is necessary to prepare them as follows:—

(1) Old monolithic concrete walls should be roughened with bush hammers or other special tools, and then washed thoroughly with water to remove all dirt and loose particles.

(2) Acid-washing, using solution of 1 part muriatic acid to 6 parts water, is another method of preparing old concrete surfaces to receive stucco. First the wall should be wetted with water so that the acid will act on the surface only. More than one application of acid may be necessary. After this treatment the wall must be washed thoroughly with water to remove all traces of the acid. If the wall is not roughened sufficiently by the acid it will be necessary to use bush-hammers as mentioned in the preceding paragraph

(3) New monolithic concrete can be roughened with a heavy wire brush or a special scoring tool if forms are removed early. In such cases care must be taken not to remove forms before the concrete is hard enough to be self-sustaining. Forms for concrete that is to receive stucco should not be given oil coatings, as those are likely to remain in the concrete, interfering with the bond. Oil on the surface of the concrete can be removed by washing with soap and water.

(4) Another method of providing rough surfaces on monolithic concrete is by the use of a special large mesh patented hessian placed on the form faces After forms are removed the hessian is stripped off the concrete, leaving a deeply scored surface.

(5) Monolithic surfaces also can be roughened through the use of special compounds painted on the form faces. These retard hardening of the surface concrete. The desired roughness is secured by brushing off the surface material after forms are removed.

Metal Reinforcement

Metal reinforcement must be used for stucco applied on wood or steel frame structures, and on masonry structures that do not provide satisfactory bond; for example, on chimneys and disintegrating surfaces, and on old stucco surfaces which are to be refinished. Metal reinforcement also must be employed wherever stucco is to be carried over flashing.

Framed wood structures to receive stucco on metal reinforcement should be well braced and rigid; studs should not be more than 18 inches on centres.

Suction

Every plasterer knows what suction is. He also knows how difficult it is to describe exactly the degree of suction required for different conditions There is a certain "feel" that tells him when suction is right Suction is absolutely necessary where stucco is to be applied directly to masonry or monolithic concrete bases in order to get the proper bond. It is also necessary in the first coat so that succeeding coat will be properly bonded

Uniform suction is essential in order to obtain uniform colour. If one part of the wall draws more moisture from the freshly applied stucco than another, the finish coat may have a spotted finish appearance. Uniform suction is obtained by dampening, but not soaking, the wall evenly before applying stucco. If the surface becomes dry in spots, these areas should be dampened again to restore uniform suction Plasterers should work on the shady side of buildings, when possible, as it is difficult to keep walls dampened properly when exposed to the sun. Suction is controlled more easily in the shade.

(Continued on next page)

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Curing

To develop maximum strength and density in any Portland Cement product it is necessary to cure it properly. This is especially true of Portland Cement stucco, which is really a thin slab of concrete. Each coat should be kept damp continuously for at least two days. Moistening should commence as soon as the stucco has hardened sufficiently not to be injured, applying water in a fine spray. Avoid soaking the wall. Give it only as much water as will be readily absorbed. Prevent excessive evaporation on the sunny or windward sides of the building in hot, dry weather.

After the damp curing period, each stucco coat should be allowed to dry thoroughly before the next coat is applied The practice of doubling coats without a two-day moist curing period followed by a drying interval is not good construction practice.

Proportions and Mixing

Measurements of materials must be accurate and all batches proportioned exactly alike. Because variations in the moisture content of the aggregate cause change in volume, due to bulking, aggregate of uniform moisture content should be used throughout the job to ensure accurate measurements.

Materials should be mixed to a uniform colour before water is added, and then wet-mixed to the desired consistency. Thorough mixing is absolutely essential. Hand-mixing is satisfactory if done thoroughly, but machine mixing usually gives greater uniformity. The mixer should be run at least five minutes after all ingredients are placed in the drum. In the case of hand-mixing, the batch should be well worked back and forth on the mixing board ten to fifteen minutes after the water has been added

Portland Cement Stucco is not injured by standing 2½ to 3 hours if remixed frequently without adding water. No mortar should be used after it has set up or hardened to such an extent that water must be added to make it workable. Admixtures to hasten set should not be used.

Flashing

Flashing, which is vital to permanent construction, must be so designed and placed that water will not get behind the stucco

APPLICATION

Base Coats on Metal Lath

The first coat should be approximately ¾ inch thick and carried the full length of the wall or to natural breaking points like doors or windows. Before the first coat hardens it should be deeply cross-scratched to provide mechanical key for the second coat.

Proportions: 1 part of Portland Cement and 3 parts of clean, sharp sand.

Before starting to apply the second coat, the surface of the first coat should be dampened evenly as described under "Suction." The second coat is approximately ½ inch thick. It should be brought to a true, even surface and then roughened with a wood float to provide bond for the finish coat. The second coat must be damp-cured for at least two days and then allowed to become dry.

Proportion. Same proportion as before. If a plasticity agent is required to increase workability, use hydrated lime in proportion not exceeding 10 lbs. per bag of cement (94 lbs).

On Masonry or Monolithic Walls

One base coat only need be applied, similar to second coat as described above

Masonry walls on which stucco is to be applied directly should be clean and dry, and before applying the base coat the surface must be dampened evenly to control suction, as essential practice in securing first-class work The base coat should be trowelled on hard and tight, being forced into surface depressions to obtain a permanent bond.

The first coat should be kept damp for at least two days immediately following its application. It should then be allowed to become thoroughly dry.

The Finish Coat

Before starting to apply the finish coat, the base coat should be dampened evenly as described under "Suction" Whenever possible, textures should be applied from top to bottom in one operation to eliminate joining marks. If the finish coat is a property line material, manufacturers' directions for application should be closely followed.

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Textures in Stucco

Spanish Texture

The stucco is applied in fairly heavy layers when creating this texture. A full trowel of mortar is used for each stroke. Strokes of the trowel are made in all directions, being curved and varied to form rolling ridges and hollows in the finished surface. A trowel with rounded corners is used so that straight-line markings will not appear in the finish.

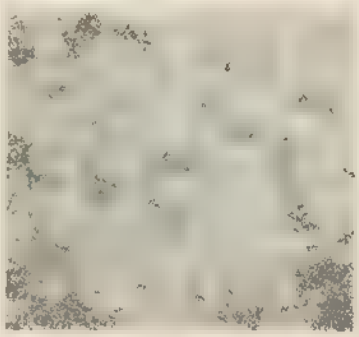
Best results are secured with a fairly stiff mortar. Uniform dampening of the base coat aids in the spread of the finish, helping to make the mortar stand as placed by the trowel. The wall should not be soaked, however, so that water stands on the surface Before the mortar hardens to a point where it has lost its workability the rough edges are smoothed out with a round-point trowel. This operation forces projecting sand particles into the mortar, tending to compact the stucco and close the surface pores, yet leaves the wavy effect necessary to a Spanish Texture. Excessive trowelling should be avoided.

A wavy, trowelled marked finish.

Californian Texture

The mortar for this texture is spread in applications similar to those in creating the Spanish. Full trowels of mortar are spread in all directions and allowed to remain as placed without additional smoothing. There are no straight-line markings, as a rounded trowel is used and curved strokes are employed Before the mortar hardens, its surface is rubbed down with a wadded piece of hessian to produce a wavy, irregular surface having a coarse texture.

The final treatment consists of trowelling the entire area.



A rubbed trowelled finish.

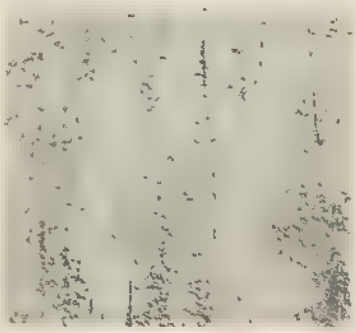
This operation creates highlights throughout the surface These are in contrast to the relatively coarser texture of the deeper areas. Trowelling also tends to force sand particles into the mortar, compacting the surface

The finished appearance is shown, an effect like that obtained in plastering over an irregular surface, with the added touch of highlights here and there resulting from the final trowelling.

Modern American

This rough - torn texture is created by the use of a heavy coat of mortar with its face roughened or torn in a vertical direction.

The mortar is applied approximately ¼-inch thick, no special effort being made to remove trowel marks Then the surface is rough-torn by drawing the edge of a wood block up the face of the wall. A downward stroke should never be used in tearing the surface. The block should be tilted at an angle with the wall as it is drawn up. A variety of straight or wavy effects is possible.



A tapestry finish.

To tear the surface lightly, the board may be held in one hand; if a heavier texture is desired, both hands should be used. The different holds on the board and positions best suited to create an evenly-torn surface will come with practice.

This texture can be given an interesting tapestry effect by lightly drawing across its surface a brush dipped in a pigment of different colour than that used in the mortar.

(Continued on next page)

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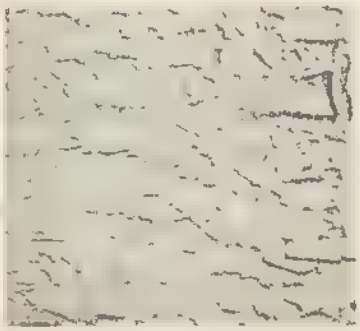
ENGLISH COTTAGE

This texture is created by feathering the stucco with the edge of the trowel into irregular wavings and surfaces.

A preliminary coat is applied about ½-inch thick. Portions of this coat are left exposed in the finished work, and other portions provide plastic surfaces on which to spread additional mortar used for creating the irregular finish. Small amounts of mortar are then applied with the trowel, using short, twisting strokes at varying angles to the wall, avoiding vertical, or nearly vertical, strokes. By twisting the trowel as the pat of mortar is applied, slightly curved ridges will be formed.



A fine, leaf-like finish.

Variations of this texture are obtained by varying the amount of mortar, the directions and length of travel strokes, and the pressure and twisting motion given the trowel. Heavier applications than those used in illustration are sometimes desirable.

ITALIAN TRAVERTINE

To create this texture a very thick coating of mortar is applied and then successively stippled and trowelled. To retard hardening sufficiently so that the stucco can be given these surface treatments the base coat must be well dampened just before the finish coat is applied. Wetting reduces the suction and consequently retards hardening.

The finish coat is applied about ¾-inch thick and trowelled fairly smooth. Then its surface is stippled deeply, using a whisk broom or wire brush to pull up an irregular texture. The stippling should be irregular in appearance.

A stippled trowelled finish

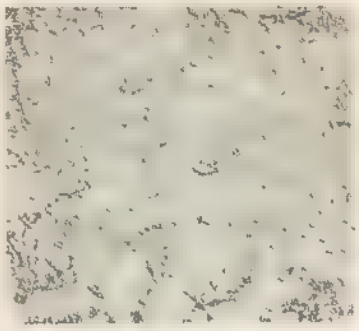
The stippled surface is later trowelled while still workable to smooth out the higher portions. Depressions made by the stippling remain rough and furnish the veined effect. Greater pressure on the trowel will give finer veining

After trowelling, joints are cut in the surface with the jointing tool.

ITALIAN TEXTURE

This texture is created with a spatter-dash applied on a thin under-coat The dash coat is trowelled to give contrasting smooth and rough areas. Polychrome finish can be secured by using differently-coloured mortars in the under-coat and the dash

A very thin coat is first trowelled on the wall. This insures uniform colour over the entire surface, even though the dash coat may not give complete coverage. Then small quantities of mortar are dashed on with quick strokes of a whisk broom A bundle of reeds may be used for a slightly different effect. Since a spatter-dash coat hardens rapidly, not more than thirty square feet of wall should be covered at a time, and then finished before any hardening occurs.



A trowelled, spatter-dash finish.

Finishing is best accomplished by placing the trowel flat against the partially-set dash coat and drawing it evenly across the face of the wall from left to right. A smoothing return stroke may be made to erase possible trowel marks. Variations will occur in this texture according to the time elapsing between dashing and trowelling Consequently this time should be constant for uniform appearance. A close-up of the finished appearance is shown.

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HYDRATED LIME

DAVID MITCHELL ESTATE

HEAD OFFICE
OLIVER'S LANE, OFF 142 FLINDERS ST., MELBOURNE

WORKS. LILYDALE, VICTORIA

STORES Burnley Siding, No. 4 North Wharf, City; Miller St. Northcote; Cave Hill, Lilydale

21a

S. A. File No.

"Limil" is a snow-white flocculent powder resulting from the specialised treatment of the famous Lilydale Lime. Its value lies in the assurance of perfect slaking by a scientific, mechanical process. (See page for a further description of "Limil" and its uses in concrete and brickwork mortar)

DAVID MITCHELL ESTATE "LIMIL" PURE LILYDALE LIME

A PLASTERING MATERIAL

"Limil" is an ideal material for plastering and finishing—it may be used for hard smooth white finish or any kind of texture finish, for complicated artistic mouldings and ornamental work.

"Limil" has the following distinct advantages as a plastering material:—

1 **Uniformity.**—Besides uniformity not only in colour but in material, it has excellent working properties and plasticity which make possible the highest type of workmanship

2 **Acoustical Value.** Due to its porous nature in the hardened state it is an excellent sound absorbing material. Its great sand carrying capacity is another reason for the splendid acoustical property of "Limil" plaster.

3 **Preservative.**—"Limil" plaster acts as preservative of metal and protects it from corrosion this is very important when a suspended ceiling on metal lath is used.

4. **Textured Finish.**—Due to its high plasticity and its ability to hold colour, "Limil" plaster offers a perfect medium for textured finish

Plastering

Internal Rendering on brickwork, concrete walls and concrete blocks

Sand	Limil
3	1

Sand	Limil	Cement
8	1	1

For great strength

6	1	1

On Wood Lath or Expanded Metal.

	Sand	Limil
1st coat	2	1 with hair to bond
2nd coat	3	1 with small quantity hair or fibre to bond

Sand Finish—

Sand	Limil
1 or 1½	1

Preferably finished with cork float. White or Grey Portland Cement may be added if extra strength is required.

Setting Coats. To run "Limil" as putty, put water in putty box, then add "Limil" slowly, stirring until a thin creamy mix is obtained Leave overnight. Excellent results are also secured by sifting "Limil" into equal part by volume of water and soaking for 24 hours.

For patching and setting small jobs "Limil" may be mixed and used immediately Gauge "Limil" putty with plaster in the ordinary way

The use of hardwall plaster in place of ordinary Plaster of Paris is recommended. Use the following proportions according to hardness required.

Limil Putty	Hardwall
½	1
2	1
1	1

Painting.—For painting on "Limil" and plaster coats use a standard priming stocked by painters' and decorators supply merchants

External

External Rendering on Concrete Walls, Concrete Blocks or Brickwork

Sand	Limil	Cement
6	1	1

The above gauge is the strongest mix consistent with economy, and gives a splendid hard rendering, finishing in a light, even colour

For walls subjected to vibration

Sand	Limil	Cement
3 or 4	1/5th part	1 part

Rough Cast—

Limil	Cement	Toppings
1	1	3

Pricking up on Expanded Metal—

Sand	Limil	Cement
3	½ part	¾ part

plus sufficient hair to bond.

Other Products

The David Mitchell Estate are also manufacturers of

Lilydale Lime	Ground Limestone
Agricultural Lime	Fluxstone
Road Metal	Limestone Spalls
Toppings	Calcium Carbonate
Screenings	

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21 b

S.A.A. File No.

PICTON HOPKINS & SON PTY. LTD.

Plastering Contractors - Architectural Modellers
Fibrous Plasterers

265A BRIDGE ROAD, RICHMOND
VICTORIA Tel · J 2160- 2169.

"PICTON" FIBROID

CONTRACTING

History

For over 60 years the name of Hopkins has been identified with good Plastering Since that time the firm—the present company was formed in 1924—has closely studied the requirements of the building trades as far as the various divisions of plastering work are concerned. Its plant facilities and equipment have been, with detailed attention, designed to adapt each of its products to meet these varying requirements

Complete Plastering Contracts

Because of the facilities later stated and the possession of complete contracting equipment, comprising scaffolding, lashings, tools, etc., we are competent to undertake plastering contracts of any type or magnitude By this method we not only reduce the cost of the job by reason of materials and labour coming from the one source, but assume undivided responsibility, making us directly answerable to the architect. Detailed information and quotations will be given on application

A.P.A. BUILDING, MELBOURNE
Morsby & Coates, Architects.
Picton Hopkins & Son, Plastering Contractors.

Some Recent Contracts

National Bank of Australia, Melbourne
Architects: A. & K. Henderson
A.P.A. Building, Melbourne. Architects· Morsby & Coates
Athenaeum Club Melbourne. Architect Cedric H. Ballantyne.
Comedy Theatre, Melbourne. Architect· Chas. N Hollinshead
Temple Court, Melbourne Architects Barlow & Hawkins
Hotel Alexander, Melbourne Architect· Leslie M Perrott
"Herald" Office, Melbourne.
Architects· H. W & F H Tompkins
A.M.P Building, Melbourne.
Architects· Bates, Smart and McCutcheon
Regent Theatres in Melbourne, Sydney, Adelaide, Auckland, and Wellington. Architect Cedric H. Ballantyne
Regent Theatre, Brisbane. Architect. Charles N Hollinshead
New Harbour Trust Building, Melbourne
Architects: Sydney Smith, Ogg and Serpell

Quality of Products

Products bearing the name or brands of Picton Hopkins & Son Pty. Ltd. are safeguarded against imperfection by rigid inspection at every stage of production. This supervision of quality over a long period of years has resulted in the name of Picton Hopkins & Son Pty. Ltd. as being synonymous with the highest standard of plaster products

Designing Services Available

Our staff of architecturally-trained designers are at your service for the purpose of co-operation in expressing your original ideas These men will—without obligation on your part—prepare estimates and schemes for any class of modern or period interior decoration

Scaffolding Service

The erection of secure and rigid Scaffolding requires not only experienced erectors but a continuously - inspected equipment of strong, well-seasoned poles, put logs, ledgers, boards, etc. Picton Hopkins & Son Pty. Ltd. maintain such a standard in their own work and that erected for the use of others. Contracts for the supply and erection of all forms of scaffolding for use in decoration, the cleaning down, or repairs to buildings are undertaken by this firm

Facilities

The superiority of our products, and success in the contracting field, is based upon the following features:—

1. Use of high-grade materials
2. Perfected processes of manufacture.
3. Possession of the services of the leading architectural modellers and craftsmen in Australia
4. Employment of organised groups of workmen
5. Complete contracting equipment
6. Ample reserves of all plastering materials, thus making us independent of other sources when urgent jobs of an extensive scale are received
7. Complete distribution facilities consisting of a fleet of motor trucks

(Continued on next page)

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

FIBROUS PLASTER SHEETS

Materials and Manufacture

Picton Fibroid Plaster Sheets for interior walls and ceilings are manufactured with the highest grade of plaster of paris and reinforced with "A" Grade sisal hemp, which is the toughest and most durable of its kind. The sheets are finished with a perfectly smooth surface, and after completion they are racked and dried in special drying rooms, where they are subjected to a natural stream of cool air.

Delivery can be made by our motor trucks to any part of Victoria. Careful crating before transportation ensures their safe delivery.

In addition to the stock sizes indicated below, we can supply continuous wall sheets of $\frac{5}{16}$ in. and $\frac{7}{16}$ in. thickness, 6 ft. and 7 ft. wide, up to 18 ft. in length.

$\frac{7}{16}$ in. sheets are all made with rebated joints to produce a flush surface, if required. $\frac{5}{16}$ in. thickness sheets are finished with square edges.

Stock Sizes

Sheet Thickness in Inches.	Sheet Size in Feet.			
[illegible]	6ft. x 3ft.	6ft. x 4ft.	6ft. x 4ft. 6in.	6ft. x 5ft.
[illegible]	7ft. x 3ft.	7ft. x 4ft.	7ft. x 4ft. 6in.	7ft. x 5ft.
[illegible]in	8ft. x 3ft.	8ft. x 4ft.	8ft. x 4ft. 6in.	8ft. x 5ft.
[illegible]	9ft. x 3ft.	9ft. x 4ft.	9ft. x 4ft. 6in.	9ft. x 5ft.
[illegible]in	10ft. x 3ft.	10ft. x 4ft.	10ft. x 4ft. 6in.	10ft. x 5ft.
[illegible]	6ft. x 3ft.	5ft. x 4ft.	6ft. x 4ft. 6in.	6ft. x 5ft.
[illegible]	7ft. x 3ft.	7ft. x 4ft.	7ft. x 4ft. 6in.	7ft. x 5ft.
[illegible]	8ft. x 3ft.	8ft. x 4ft.	8ft. x 4ft. 6in.	8ft. x 5ft.
[illegible]	9ft. x [illegible]	9ft. x 4ft.	9ft. x 4ft. 6in.	9ft. x 5ft.
[illegible]in.	10ft. x 3ft.	10ft. x 4ft.	10ft. x 4ft. 6in.	10ft. x 5ft.

Also in both thicknesses—5ft. x 5ft.; 5ft. x 4ft. 6in.; 5ft. x 4ft.

ORNAMENTAL FIBROUS PLASTER

Fabrication

During the process of fabrication, Picton Hopkins' Ornamental Plaster has all the advantages of skilled workmanship and careful supervision, which results in its superior qualities of strength, durability and good appearance.

Our competent staff of modellers ensures the production of accurate casting moulds, which may be of plaster, cement or wood, according to the nature of the requirements and finish of the final casting. Enrichments of ornament are formed in gelatine moulds because of the great latitude allowed in casting beautiful, richly moulded members with under-cut relief ornament.

Great care is exercised in executing the finished castings, which, after being reinforced with hemp, hessian and laths, are removed to the drying rooms, where they are allowed to completely harden prior to transportation.

Cornices and mouldings being already reinforced in themselves by the scientific placing of reinforcing ribs, additional structural framing for tieing is, in most cases, unnecessary.

Fixing

To secure the architect's satisfaction, we prefer to undertake the complete contract of fabrication and fixing. This arrangement not only ensures sound and solid fixing, but reduces fixing costs, as our skilled fixers, whose time is completely devoted to this class of work, are naturally able to complete a contract in much less time than men who are not continuously engaged as fibrous plaster fixers. If this, however, is not possible or practicable, we urge that the architect insist upon the employment of competent fixers only. We recommend this, as our interest in our fibrous plaster products follows right up to the complete installation, and we have no wish to see injustice done to our work by careless or faulty fixing.

In jobs of a large scale or comprehensive nature, an early discussion on fixing methods is advantageous. With our co-operation every important detail can be considered and decided before the actual work is commenced.

Stock Designs

Picton Hopkins' Fibrous Plaster, with its adaptability, durability and comparatively low initial cost, is available in a wide range of stock designs embracing the breadth and treatment of mediæval period work, the refinement and precision of classical ornament, and the symbolism of modern art, any of which may be adapted to the treatment of the most modest home or to the highly decorated mansion.

On the following pages there are shown a few designs which are typical of the huge range held in stock. Assistance and suggestions in selection will be gladly given.

Side Wall Treatment, Regent Theatre, Brisbane

Plate No. 1 shows a series of mouldings and cornices suitable for application in cafes, hotels, etc., or the larger size home.

Those on Plate No. 2 give refinement, at an economical cost, to the home of more moderate dimensions.

The ceiling panels on Plate 3 include some examples of modern work, as well as those typifying the elegance of the popular Adam Period.

Plate 4 illustrates wall panels, expressing the grace and daintiness of the Renaissance era.

Plate No. 5 shows a miscellaneous collection of plaques, medallions, bosses, etc., which so often contributes to the success of an interior decoration scheme.

Special Designs

Our modern shop and facilities permit endless possibilities for the reproduction in fibrous plaster of the Architect's individual designs. We are able to obtain a variety of effects—from those produced by simple mouldings relieved with low relief ornament to richly-moulded members embellished with elaborate ornament. Continuous ornament in fibrous plaster is economical and is most advantageous for mass production and rapid erection.

(Continued on next page)

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

PLATE No. 1—MOULDINGS AND CORNICES.

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

PLATE No 2—MOULDINGS AND CORNICES

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

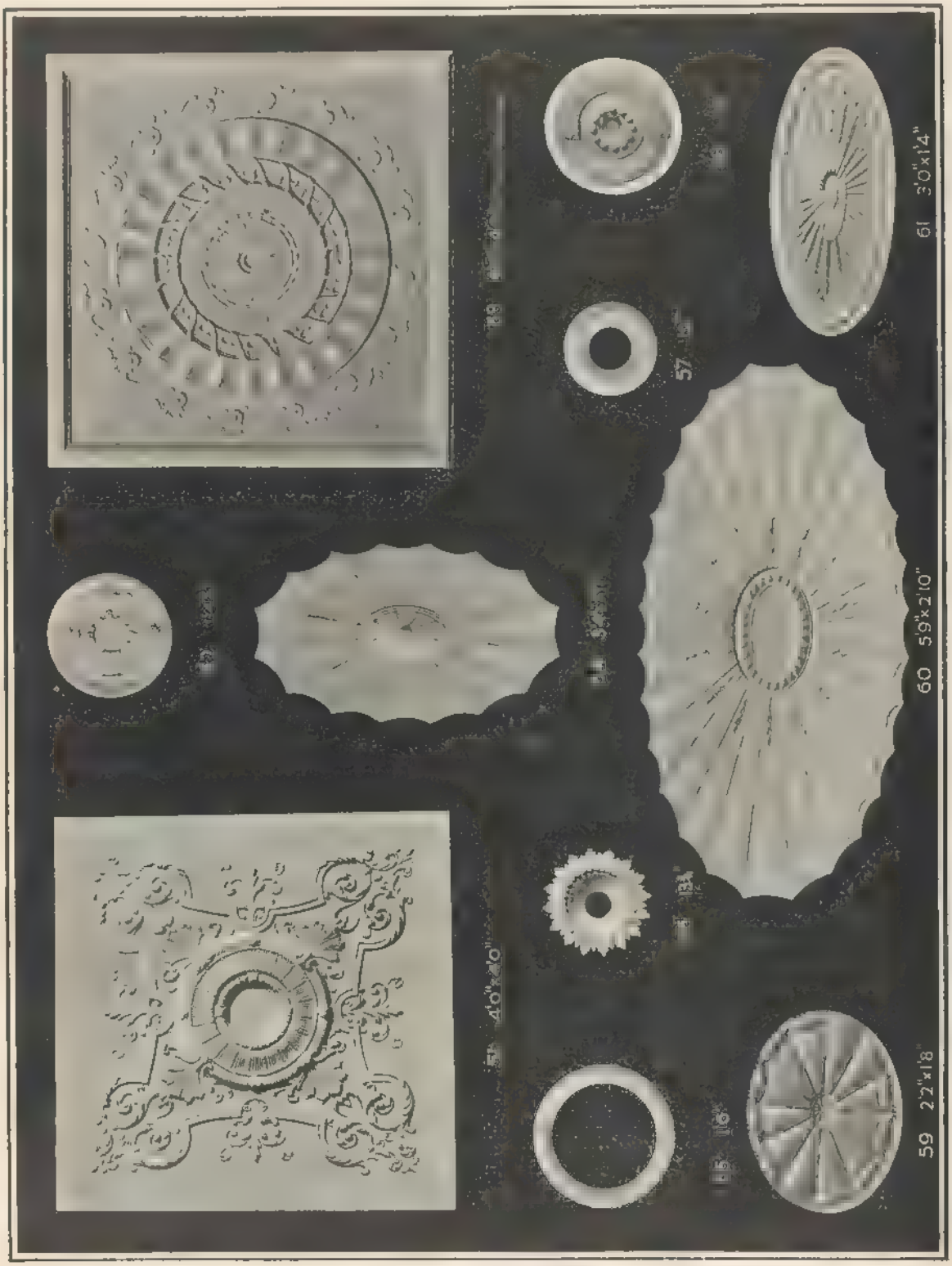


PLATE No. 3—CEILING PANELS.

(Continued on next page)

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

PLATE No. 4—WALL PANELS

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

TEXTURAL WALL EFFECTS

Textured Wall Finishes

During recent years there has been a considerable development in textured finishes for external stucco and internal plaster finishes. The home owner has learnt to appreciate the charm of depth and colour, while the architect has enthusiastically seized his opportunity in reproducing his conceptions of the mellow beauty, colour and texture of the picturesque walls of the Old World

The range of effects is great—an infinite variety of colour and texture being obtainable. But often, through poor materials, workmanship and lack of imagination by the craftsmen, the desired effects are limited in their ultimate achievement. It is only by the use of high-grade materials and skilled craftsmen — such as maintained by Picton Hopkins that these colourful texture finishes can be satisfactorily applied

Application

We have specially organised facilities for the execution of textural wall effects, and can undertake to supply materials, tools and scaffolding, etc., and faithfully carry out the intent of the architect's design, no matter of what period or how simple or bizarre it may be. We will either carry out the complete operation, i.e., from the first rendering coat to the finished textured finish, or apply our texture to first and second coat work prepared by others

Some of our recent applications include those in **Wentworth House and the Regent and Comedy Theatres, Melbourne.**

Materials

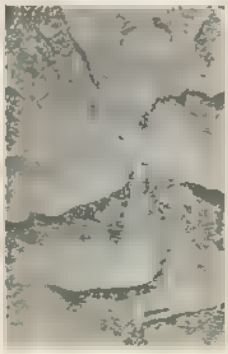
The materials utilised for both interior and exterior textures are selected from the highest grade of those available

Great importance is attached to the preparation of textures in which mineral oxides, pigments or various kinds of sand may be used. When pigments are used, they are carefully ground and graded in the proper proportions before being sent out, so as to obtain absolute uniformity when applied

Often, when varying tones and shades are required for the one finish, necessitating the use of three or four pigments, the above preparation is of great advantage when compared with some types of textures which are prepared on the job. The risk of allowing this to be carried out in the absence of proper measuring and weighing facilities and means of expert colour selection can be readily appreciated by the architect. Our experience in the selection and grading of materials and non-fading colours ensures complete uniformity and quality and assurance of obtaining the desired finish

Colour and Texture Selection

You are invited to confer with Picton Hopkins & Son Pty. Ltd., who will offer suggestions regarding the selection of various modern and period texture finishes. We will show you photographs of outstanding work, and, if desired, an actual demonstration can be arranged which will show some of the beautiful and unique finishes we can produce. Through personal contact, we are convinced that we can demonstrate to you the thoroughness of our work and its economic advantages in the shape of durability and permanence



English

Spanish

Italian

French

Texture Wall Effects that can be satisfactorily applied by Picton Hopkins' craftsmen.

Pressed Cement Work

Ornamental work and enrichments for imparting dignity to buildings having external stucco walls can be economically and satisfactorily produced in pressed cement by Picton Hopkins & Son Pty Ltd. Schemes submitted to us will be faithfully followed and produced with all the crispness and clean-cut features that may be embodied in the design

Briefly, the process of manufacture is as follows:—After the architect's design has been carefully modelled and cast in plaster of paris sectional moulds, material consisting of Portland cement and well-graded, clean sand, thoroughly mixed to proper proportion and consistency, is pressed firmly into the moulds and allowed to reach a stage of incomplete setting before the moulds are stripped. After this, the work is kept in a moist condition until it is completely set and hardened, and ready for delivery to the job.

Wood Carving

Due to presence in the studios of skilled wood carvers whose services are principally engaged for the carving of elaborate wood moulds for the production of ornamental fibrous plaster castings, Picton Hopkins & Son Pty Ltd are able to undertake work covering the complete range of wood carving necessary for the embellishment of ornamental woodwork

The craftsmen employed by us have had wide experience in all phases of their craft, and are fully competent to carry out such work as the carving of ornamental panels, church furniture, wood statuary, etc., which may be submitted to us for finishing off from its rough carved conditions, or for working up from the preliminary to final stages Demonstrations by these men will prove their ability in executing any of the foregoing work.

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SECTION M

[Containing S.A.A. Filing Section No. 27]

HARDWARE

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

27a

S.A.A. File No.

GEO. KINNEAR & SONS PTY. LTD.

Warehouse.
114 KING STREET, MELBOURNE

Factory.
110 BALLARAT ROAD, FOOTSCRAY, VIC.

Depots At:

SYDNEY O. Pendergast & Co., 416 Kent St.

BRISBANE. B. J. Ball (Q'land) Ltd., Charlotte St

ADELAIDE: A. Murdoch & Co., Charles St.

TASMANIA: All Merchants

Products

Manufacturers of all kinds and sizes of "Emu" brand Braided and Plaited Cotton, Jute and Hemp Sash Cords; Venetian and Verandah Blind Cords; Scaffolding Ropes and all Building and General Ropes.

"Emu" Brand

The Trade Mark is illustrated by an Emu standing on a coil of Rope with the words "Emu" Brand above the design. The wrapper on all coils or hanks of sash cord bear this Trade Mark as a guarantee of quality and service.

Braided Cords

It has been found that cord can be braided too hard for durability, yet if it is braided so as to be very flexible it may be so soft that it will stretch and cause great annoyance by permitting the sash weight to hit the bottom of the weight box. These defects are completely overcome in the manufacture of "Emu" Brand Braided Cords First, the cord is braided of cotton, being the only fibre that will stand constant bending over a pulley; secondly, our process of finishing takes up all the stretch and thus the cord does not lengthen by wear, but maintains the sash weight at its correct height

Other features of "Emu" Brand Braided Cotton Cord is its inability to jam in the sash pulley and its smoothness of running, thus precluding all possibility of broken sash cords

We manufacture cheaper cords of jute, these are used where price is the first consideration, but we recommend that in all first-class work braided cotton cord be used because of its longer life and freedom from potential troubles

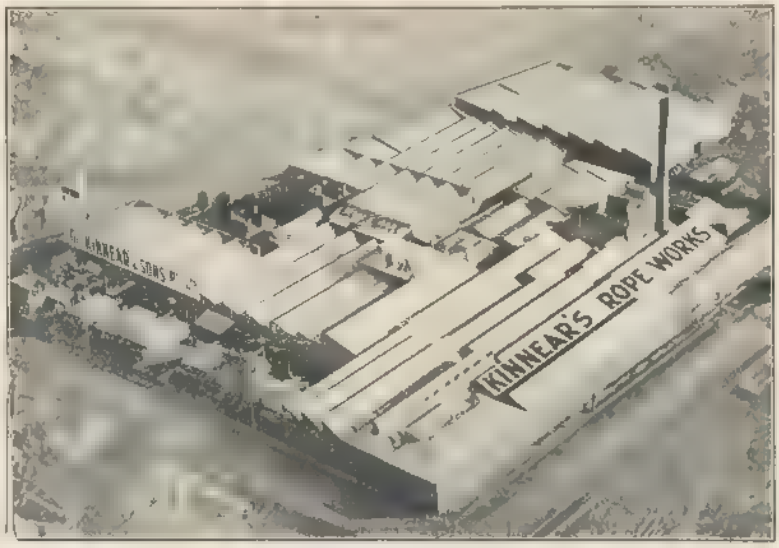
How Available

"Emu" Brand Cotton (Braided) Sash Cord is made in 8 standard sizes and may be had in hanks each 36 ft. in length, (6 hanks connected) or in reels with card board centre up to 28 lbs., or in any size coil up to 1 cwt., in one continuous length.

A Hank of "Emu" Brand Sash Cord.

Guarantee

We will extend to every architect who specifies (as in the specification set out below) "Emu" Brand Cotton (Braided) Sash Cord a certificate of guarantee against the breakage of the cord for a period of ten years after installation.



Aerial View of Factory, Footscray, Vic.

Samples

Sample card showing the various sizes and grades of sash and blind cords, together with price lists, will be gladly sent on request to architects and builders.

Special Cords

Cords can be made to order for any purpose in any special colour or size or type

Estimates

Estimates will be gladly furnished on request for any specification for cord

Blind Cords

Plaited cotton Venetian Blind Cord is also made by us and stocked in four weights of 2, 2½, 3 and 4 lbs. per gross yards For Verandah Blind use "Emu" Brand Plaited Cotton Cord, made in five sizes, as follows, ¼ in., ⅜ in., ½ in., ⅝ in. and 1 in. circumference

These cords are of superior quality and are guaranteed against all inherent defects found in cheaper cords

"Emu" Brand Plaited Cotton Venetian and Verandah Blind Cords are available in hanks and reels similar to sash cords

Scaffold Ropes

These ropes are for use in the building trade and are made up in any lengths as required (usually 17 ft.), and are whipped at each end ready for use. They can be supplied in two qualities of manila, the best quality is recommended for economy and long service

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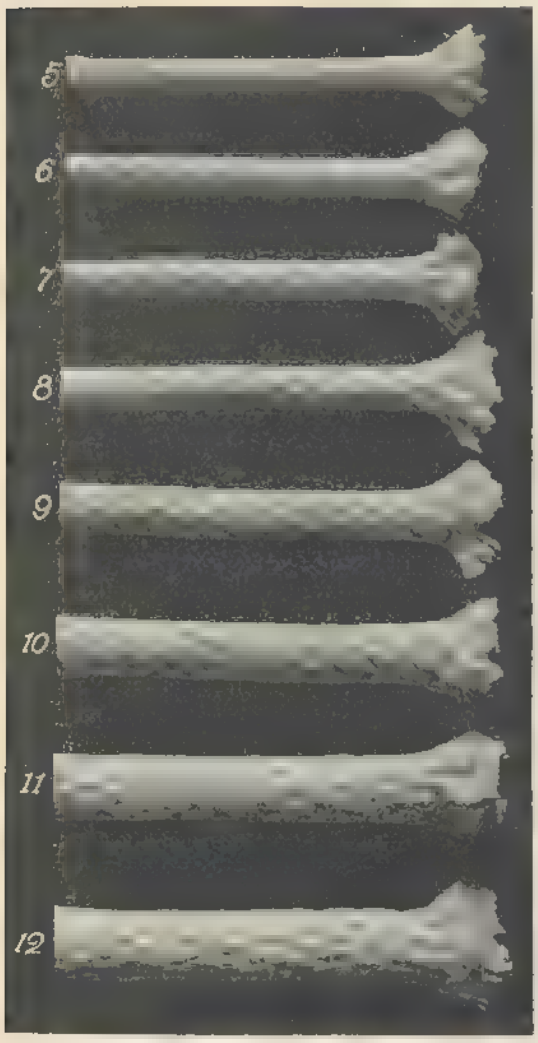
DATA ON SASH CORD



Actual full-size illustration of "Emu" Brand Cotton (Braided) Sash Cord

Sash Cord Sizes

The number of a cord is equal to the diameter in 32nds of an inch, for instance, No. 9 cord measures 9/32 in. in diameter. To ensure the correct and even wearing of sash cords it is recommended that the weight for each cord and the diameter of the pulley used should be as set out in the following schedule.

Weights per Cord.	Minimum Pulley Diameter	Cord. Size of	Diameter of Cord	Circumference of Cord.	Approx. No. of feet per lb.
Up to 5 lbs.	1½"	5	5/32"	½"	100
Up to 6 lbs.	1½"	6	6/32"	⅝"	70
6 to 12 lbs.	1¾"	7	7/32"	¾"	54
12 to 20 lbs.	2"	8	¼"	¾"	46
20 to 30 lbs.	2¼"	9	9/32"	⅞"	38
30 to 40 lbs.	2½"	10	5/16"	1"	30
40 to 45 lbs.	3"	11	11/32"	1⅛"	25
45 to 50 lbs.	3"	12	3/8"	1¼"	20

Weights of Sashes and Glass

To determine the approximate weight of glazed sashes, use the following figures.

Glass—

21 oz glass [illegible] lbs per sq. foot
26 oz glass 1 [illegible] lbs per sq. foot.
Obscure glass averages 1.8 lbs per sq. foot
¼ in. plate glass 3.6 lbs. per sq. foot.

Sash Frame—

Using red pine and averaging 2½ in. width of material, add the height and width of each sash and multiply by

1.6 for 1½ in. sash
1.8 for 1¾ in. sash
2.1 for 2 in. sash

the answer is in lbs.

As these figures are approximate, it is recommended that the actual glazed sash should be weighed.

ARCHITECT'S SPECIFICATION

SASH CORD.—All double-hung sashes shall be hung with "EMU" Brand Braided Cotton Cord, to be in conformity with the Cord Manufacturers' recommendations for size of cord pulley and weight of sashes.

DATA ON SASH PULLEYS AND WEIGHTS

(Prepared by the Architectural Staff of Ramsay's Catalogue from Authentic Sources)

SASH PULLEYS

1. **Cottage Work**—Pressed steel axle pulleys.
2. **General Use**—All iron secret axle pulleys (cast in two pieces). Sizes—1¾ in., 2 in., 2¼ in., and 2½ in. diameter.
3. **For Better Class Work**—As above, with (a) Brass face and iron wheel or (b) Brass face and brass wheel, in sizes as before.
4. **For Heavy Sashes**, and easy running—Ball bearing, brass face and brass wheel, in sizes as before.

SASH WEIGHTS

1. **Cast Iron** (in stock sizes). Are made with a tapered hole in the end for fastening the cord. Weights range from 1½ lbs. to 25 lbs.
   1½ lbs. to 4½ lbs. are 1⅜ in. in diameter
   5 lbs. to 9½ lbs. are 1½ in. in diameter
   10 lbs. to 14 lbs. are 1⅝ in. in diameter
   14½ lbs. to 19½ lbs. are 1¾ in. in diameter
   20 lbs. and over are 2 in. in diameter
2. **Cast Iron** (for special jobs). Where headroom is limited the weights can be made of a section to utilise the pocket space to full advantage. They range from 1 in. square, perhaps, 1 in. x 1½ in., 1⅜ in. x 1½ in., 1¾ in. x 1½ in., 2 in. x 1½ in., up to 2½ in. square.
3. **Lead**—Where headroom is still more limited, or with a [illegible] sash weights are of lead, which require a length [illegible] iron.

Where two or more sashes are close together and the weights would foul each other, a pulley may be fixed in the end of the weight, and two pulley weights are thus used instead of four single weights, the cord coming down from one sash, under the pulley and up to the second sash. This pulley weight, being twice as heavy as the single weight, has only half the travel. Such weights are made of lead or iron to the required section, round or square.

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

27a3

SAVE NO.

P. C. HENDERSON LTD.

BARKING — ESSEX — ENGLAND.

SOLE WORKS AND TECHNICAL REPRESENTATIVES:

VICTORIA, SOUTH AUST., TASMANIA.
Victor H Moodie, Carson Place, 205a Little Collins Street, Melbourne.

NEW SOUTH WALES, QUEENSLAND.
E. W. Garside & Co., 46 Carrington Street, Sydney

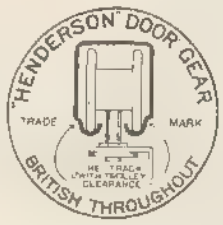
SLIDING DOOR GEAR

ANNOUNCEMENT TO AUSTRALIAN ARCHITECTS, ENGINEERS AND CONTRACTORS

P. C. Henderson Ltd., of England, desires to announce the introduction to the Australian building field of their complete line of British-made Sliding Door and Window Gear. Stocks covering every type of hardware for sliding doors and windows will be available from the leading hardware houses

Architects will shortly be in possession of the latest illustrated catalogue No. 32. This is the most comprehensive treatise on sliding door and window equipment that has been put before the Architectural profession.

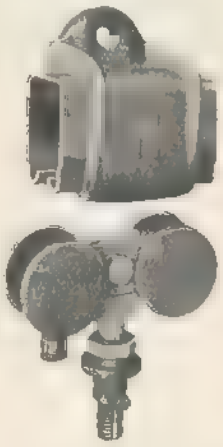
Study the Trade Mark. Note carefully the design



Note the offset for trolley clearance. Look for the name in all advertisements and products. This Registered Trade Mark is your protection—you may buy with confidence. It represents the hall-mark of British door, partition and window gear.

The outstanding features of Henderson Door Gear are
"Copper-Amalgam" steel tracks, giving prolonged life.
Use of rustless metal wherever possible and necessary.
Improvement to bearings and patented lubrication.
Improvement to hangers with patented locking adjustment.
Improved forms of bottom guide and adjustment of rollers
Improved and new types of window gear.
Improved furniture and accessories.
Blue prints, drawings, service of technical representatives, and inspection.

A section of Henderson's "Copper-Amalgam" Steel Tubular Tracks and one type of bracket—also a complete lubricated roller bearing hanger. Note vertical adjustments and patented locking device.



A vital part of Henderson's "Tangent Lock-up" Garage Door Gear, showing section of track with door hanger in position. These fittings are well and truly made to stand rough handling. They are economical and foolproof

Henderson's Sliding Door Track, sold everywhere, can be measured in miles—a striking tribute to the efficiency of this British-made product

Henderson Sliding Door and Window Gear cover a wide range of application. The following types are available:—

1. Straight run, single, double or treble track for doors and windows.
2. Shop Ladder gear.
3. Heavy curtain runners.
4. "Tangent" garage door gear for light, heavy and ultra-heavy duty.
5. "Tangent" folding gear for garage doors.
6. Band Stand gear.
7. "Council" folding partition gear for central and end folding.
8. "Mansion" gear for high-class interior work.
9. Overhead runways.

Each type is complete with tracks, brackets and hangers, hinges, bottom guides and rollers, flush pulls and end stops, locking and trolley gear, all as may be ordered.

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

McEwan's *for Quality Hardware*

JAMES McEWAN & CO. PTY. LTD.

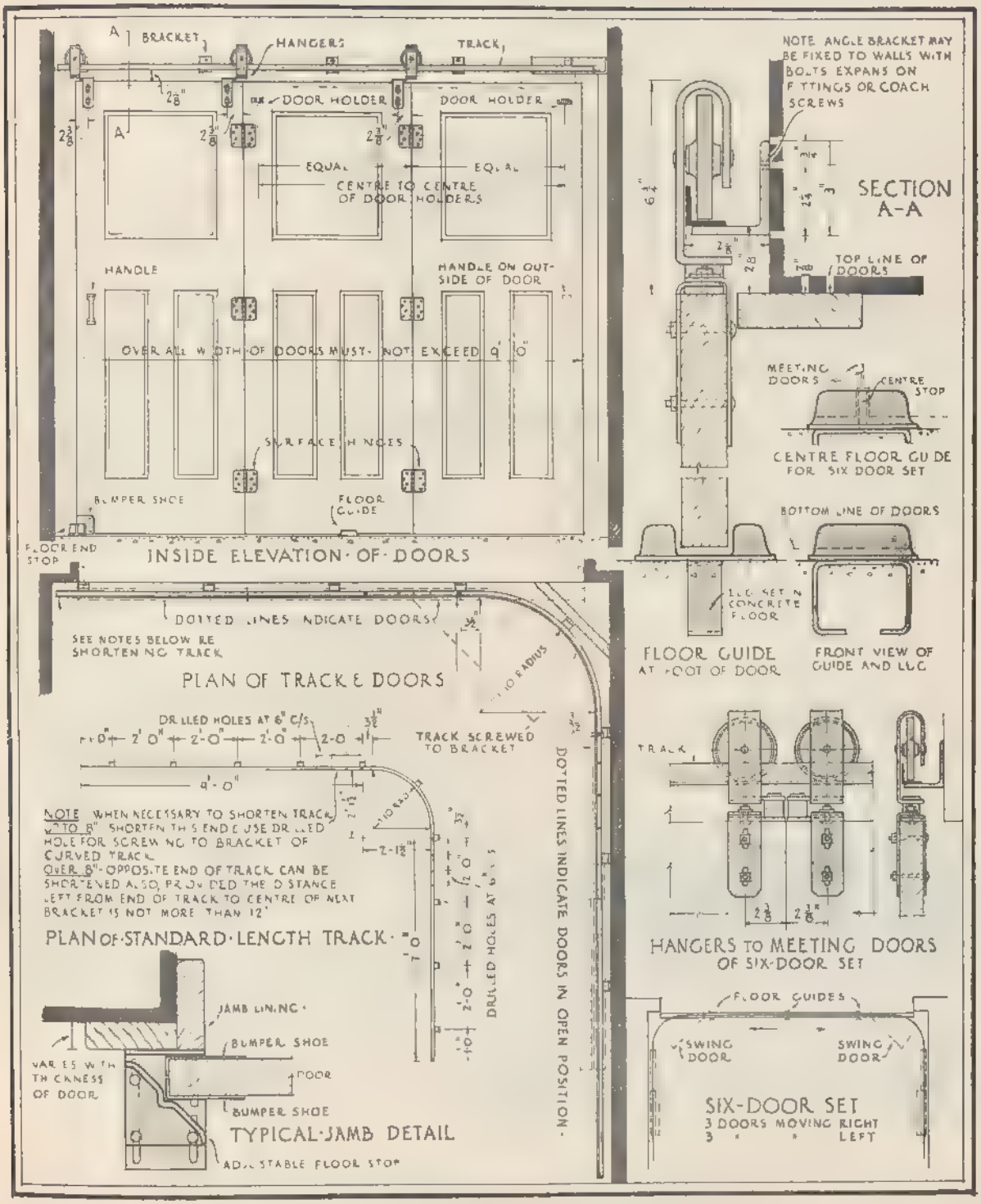
119 ELIZABETH STREET, MELBOURNE

SUPPLIERS OF:

Awnings and Blinds, Cooking and Heating Equipment, Electrical Fittings and Accessories, Fireplaces and Mantels, General Builders' Hardware, Kitchen Furniture, Garage Door Equipment, Gas Appliances, Lawn Mowers, Paints, Pipes and Pipe Fittings, Roofing Materials, Sanitary Ware, Valves, Waterproofing Products and all General Building Materials.

27a

S.A.A. File No.



INSTALLATION DETAILS OF McEWAN'S GARAGE DOOR EQUIPMENT

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

27 a

S A A File No

WORMALD BROS. LIMITED

FIRE PROTECTION ENGINEERS
SINCE 1889

CITY OFFICE: 19 BLIGH ST, SYDNEY. FACTORY: YOUNG ST, WATERLOO, SYDNEY

BRANCHES.

MELBOURNE—180 Bay St., Port Melbourne. BRISBANE—"City Buildings," Edwards St
NEW ZEALAND—"T & G." Buildings, Wellington. ADELAIDE—Bowden.
PERTH Wellington St.

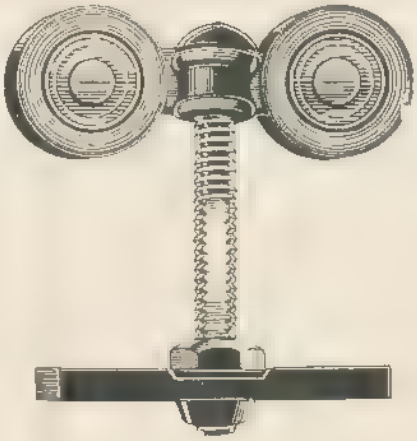
[For Other Products, See Index]

"BANGOR" BALL BEARING DOOR HANGERS

The "Bangor" Hanger

"Bangor" Hangers are made entirely in Australia and can be confidently specified for any job, as stocks can always be had. There is a type of hanger to suit any sliding door and the standard track suits all types, with the exception of parlour or house doors sliding into a cavity. A special paragraph describes this type in detail

Most hardware stores stock "Bangor" now, so that your contractor will have no difficulty in completing his job The inverted track is of great benefit where dust and grease might accumulate, and it also gives protection to fittings in the open air, such as on store doors, etc.



The "Bangor" Carriage and Door Plate.

House Door Hangers

Parlour or House Door Hangers are made specially for doors to slide into cavity walls and can be relied upon to give [illegible] service. They have a vertical adjustment of 2½ inches and are easily fixed into position.

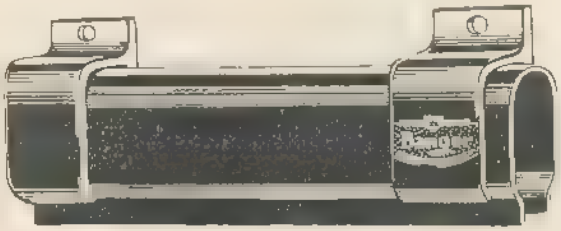
A special slotted "header-plate" is provided for holding the track inside the cavity and, for this type, special counter punched track is used.

The track is supplied in one length for openings up to four feet and in two lengths for larger openings

The diagram below gives the amount of room required and shows the method of fixing.

"Bangor" Track and Brackets

"Bangor" Track is stamped out of 12 gauge steel in lengths up to 10 feet. The Brackets are malleable cast iron, capable of carrying a great weight. The standard track will carry up to 800 lbs weight, though with extra bracketing the track has been tested safely up to 2,500 lbs weight



Piece of "Bangor" Track with End and Centre Brackets.

Adjustment

Adjustment is given in each type of hanger, so that perfect ease is found in levelling off doors. This is done by means of a lock-nut which operates on the pendant bolt of the carriage.

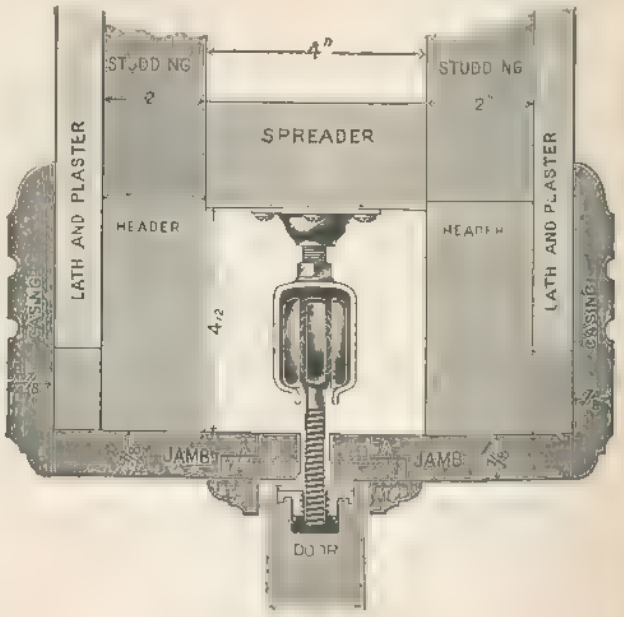


Diagram Showing Space Required for Fixing "Bangor" Parlour Door Hangers.

(Continued on next page)

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

Hangers for Accordeon Doors

Accordeon Doors are an ideal means of dividing off large rooms such as schools or halls, and are very easily operated when on "Bangor" Track and Hangers Each door should not exceed three feet in width and should not weigh more than 90 lbs. Furthermore, they should be at least 1½ inches thick so that secure fastening can be obtained. A special ball bearing pendant bolt carriage is used for accordeon doors so that no binding occurs when they swivel. The carriages must be fastened to the exact centre on top of door and are used on the outside and then every alternate door. The half-door must be hinged to the jamb at the side of the opening.

Accordeon Doors on "Bangor" Hangers.

Store or Barn Door Hangers

Store or Barn Door Hangers are used with the ordinary side brackets, as illustrated with the piece of track on the previous page. They are made for doors to slide on the outside of an opening and carry the doors on triangular iron "aprons" screwed on to the outside of door at the top. Two of these hangers are needed for each door. There are two sizes of "Bangor" Barn Door Hangers—No. 4 is for doors from 1¾–2¼ inches thick and weighing up to 300 lbs., while No. 5 will take doors weighing from 300–500 lbs., and measuring 2⅝ to 3 inches thick. Both vertical and horizontal adjustments are given with this type of hanger, so the door can be set out the required distance from the wall.

Elevator Door Hangers

For elevator doors, the plain standard track is used with side brackets, but they are fastened with flat door plates, as used on parlour doors. The usual size of elevator doors is from 2 ft. 6 in. to 3 ft. wide. Track should be just twice the length of the opening and needs two end brackets and one centre bracket. Rubber Tipped Door Stops are also provided, and Floor Channels, if required.

Length of "Bangor" Track and Hangers for Elevator Doors.

For GARAGE Use
"GLIDOOR" TRACK and HANGERS

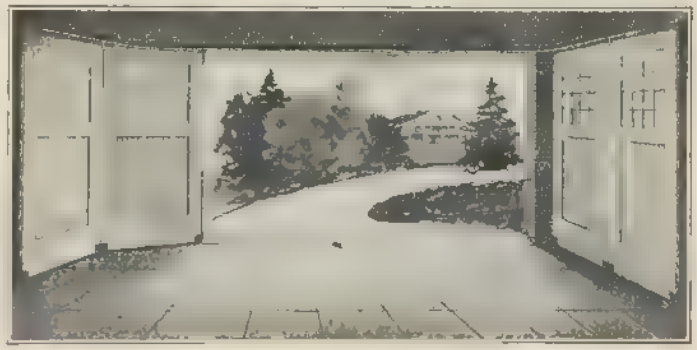
Heavy doors can be run round the corner on special curved "Bangor" sections, but we strongly recommend the new "Glidoor" Track and fittings for all ordinary use. "Glidoor" is a strong, single-edge track, supplied complete in sections, with full instructions for erecting on the package. It gives an easily fixed, free running door, with curved brackets and track sections to suit any job.

Price is a big consideration of the private car owner and we have evolved the "Glidoor" set for curved tracks as a cheaper means of hanging the now popular round-the-corner doors It includes everything necessary to completely equip a garage opening: All door hinges, handles, door stops, floor guides, bolts and screws There is nothing extra to buy

When showing curved-track doors always give distance from door jamb to wall and state whether single-leaved or hinged door. The most suitable method for your requirements can always be had on application to a leading hardware merchant or to us direct.

ARCHITECT'S SPECIFICATION

Specify "Bangor" or "Glidoor" Track and Hangers complete of.....type, for opening..... In the case of doors in more than one section, state full particulars as to whether sliding from both sides, number of sections, etc.



"Glidoor" Curved Track for Garages

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

27*a*

S.A.A. File No.

RICHARDS-WILCOX MANUFACTURING CO.

AURORA, ILLINOIS, U.S.A.

Australasian Agents

MOLDEN, WEBER & CO. LTD.

P.O. Box 1349J, SYDNEY, N.S.W.

Also At

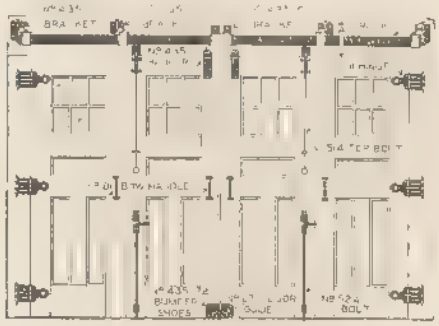
BRISBANE MELBOURNE ADELAIDE WELLINGTON

R-W EQUIPMENT FOR EVERY GARAGE DOORWAY

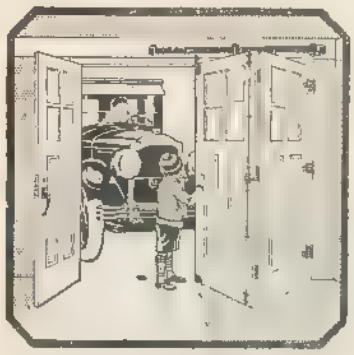
R-W "SLIDETITE" EQUIPMENT

"Slidetite" equipment consists of complete sets of hardware for the operation of from 2 to 10 doors closing in the one opening. The doors are so hinged together and suspended at intervals on hangers running in overhead tracks that the doors open or close with a sliding-folding, accordion movement, and at all times occupy a minimum of space. Up to 30 ft. in width no intermediate posts or mullions are required.

When open, the doors are carried to one or both sides of the opening compactly folded together and swung clear of the jamb, the opening standing open at an angle to the front wall or, where space permits, folded parallel with the front wall.



Doors equipped with typical "Slidetite" hardware. The expense of a separate entrance door is eliminated.



Doors equipped with "Slidetite" are easy to operate—a child can open and close them.

Features

The outstanding feature of "Slidetite" is that its method of operation causes the doors to close absolutely tight together and against the rebate at the head jamb and sill.

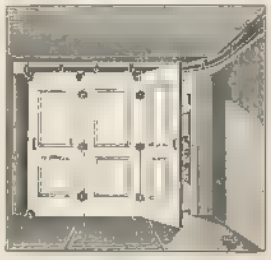
They are extremely easy to operate. R-W hardware being adjustable, prevents the doors from any sagging that may put them out of alignment.

Hardware Furnished

Each "Slidetite" set consists of the requisite quantity of track, hangers and door locking devices, together with all bolts and screw attachments necessary to operate the number of doors for which the set is intended. Complete erection instructions are provided with each set of equipment.

R-W "SLIDASIDE" EQUIPMENT

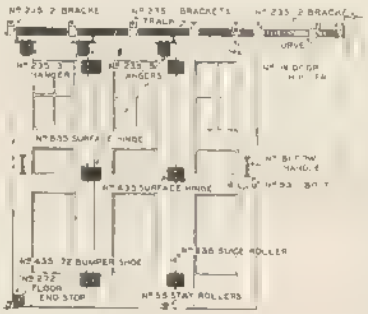
This equipment is frequently specified when a garage is not deep enough to fold the doors inside. "Slidaside" equipped doors, when opened, slide around the corner (regardless of the distance from the door jamb to the side wall), and stand at right angles to the door opening, along the inside wall of the building. The end door nearest to the side of the building to which the doors slide is used as the entrance door; it is therefore not necessary to open all the doors at the one time.



When the garage is not deep enough to fold the doors, use a "Slidaside."

Adaptability

"Slidaside" hardware is adaptable to various doorway conditions and arrangements. (1) Single doors with wall space between jambs and side wall. (2) Single and double doors with jambs adjacent to side walls. (3) Pair of doors hinged together for opening with space between the jamb and side wall. (4) Three doors hinged together and sliding to one side. (5) Six doors, three of which are hinged together, sliding to the right, three of which are hinged together and sliding to the left.



"Slidaside" hardware applied to a 3-leaf doorway.

Hardware Furnished

Each "Slidaside" set consists of the requisite quantity of track, brackets, hangers, floor guides, end stops, hinges, handles, door holders, stay rollers, locks and bolts, together with all bolts and screws for attachment, necessary to operate the number of doors for which the set is intended. Complete erection instructions are provided with each set of equipment.

Door Sizes and Weights

It is recommended that individual doors (all of the same width) should not exceed 3 feet wide nor 250 lbs. in weight for "Slidetite" or "Slidaside" equipment. Heights may vary up to 12 feet, provided the weight limitations are not exceeded.

Molden, Weber & Co. Ltd. are always pleased to co-operate with the architect in the selection of R-W equipment for any garage doorway.

(Continued on next page)

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

R-W FOLDING PARTITION DOOR HARDWARE

In many churches, colleges, Y M.C.A. hostels and business houses, folding partition doors are installed so as to make possible the converting of large halls into many small rooms, or vice versa, at will. R.W. hardware is ideal for such installations. With No. 237 hardware the doors are hinged together in pairs, by invisible hinges, and each pair of doors operated as an independent unit. The weight of the doors is carried by hangers running in a trolley track above the opening. A floor track and guide is provided to guide the bottom of the doors. All the doors may be folded to one side or they may be divided at the centre and half of them folded each side. In either case a clear unobstructed opening is made with the doors completely folded against the wall. Generally, the door nearest the jamb toward which the doors fold, is pivotted to the floor and to the head jamb.

PASSAGE DOORS.—When the partition doors are small, one door can be used as a passage door from room to room when the partition is closed. There should be an odd number of doors in the opening, the passage door being the odd one. It is not recommended for doors over 9 feet high.

WICKET DOORS.—When doors are large, a wicket door (i.e., a smaller door in one of the partition doors) can be placed in any of the doors except the pivot door.

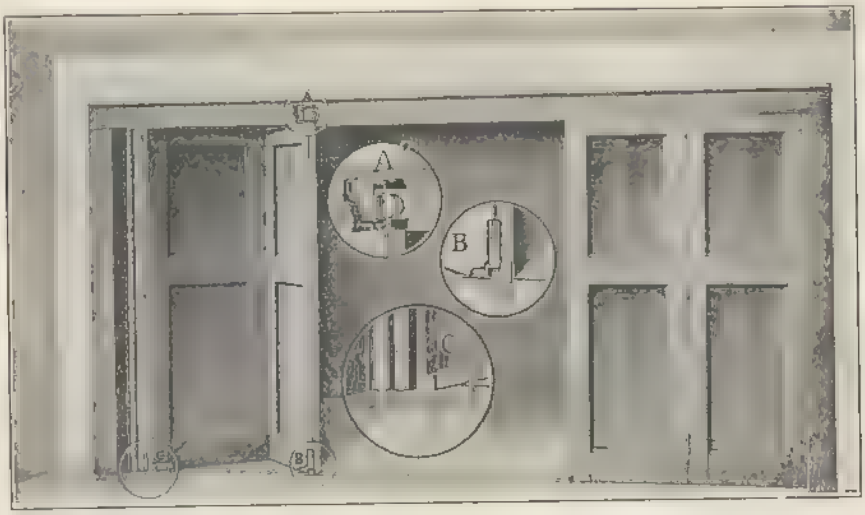
HARDWARE FURNISHED. Complete hardware consisting of track, hangers, floor guide, floor track, bolts and hinges, with exposed parts in three finishes as desired: solid brass, plated or black is furnished with each set.

SIZE OF DOORS.—Thicknesses and weights of doors for each type of track are given in the table below. Doors approximately 3 feet wide are recommended.

Sets for Track No.	Thicknesses of Doors. Inches.	Max. Wt. of Doors—Lbs.	Wt. of Hardware per door—Lbs.
30½	1⅜	50	13
75	1¾ to 2	110	17
33	2 to 2¼	225	30
232	1¾ to 2½	150	25

In the illustration, all six doors, in pairs, side and fold to the left when equipped with R.W. No. 237 Hardware.

A (in circle,—shows Bracket, Track and Hanger



B—Shows Floor Guide and Floor Guide Track.

C—Shows Pivot Plate, Stops and Stop Plate.

"AIR-WAY" MULTIFOLD WINDOW HARDWARE

The "Air-Way" method of operating a series of windows in a row eliminates the need of hanging each sash independently on hinges attached to intermediate mullions.

The "Air-Way" method is to connect several sashes in a series so that they can be folded up and leave a clear space in any opening from 4 ft. 3 in. to 16 ft. 6 in. wide by 5 ft. high. When not in use they fold up conveniently at the side of the opening.

INSTALLATION AND OPERATING.—Tracks are fitted at the lintel and the sill, and sashes connected together by adjustable sash links at both top and bottom, as shown in the diagram. On each adjustable link there is a small wheel which runs in the top and bottom tracks. This is what keeps the sash in place. The end sash is hinged to the jamb and this sash is the first to be opened. As this sash swings, the connecting link with the next one in the series pulls the entire string of sash in that direction.

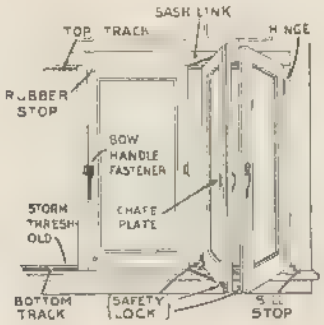
As soon as the first sash is opened, the second sash may be opened in the same way and this in turn releases the lock which holds the third sash, and so on. The sashes must be opened in this order, the advantage being that when the sashes are all closed, locking the end sash locks the entire series against incorrect operation.

When open, each sash will remain in position to which it is opened without shaking or rattling. If desired, one, two or more windows may be opened without opening the entire series. The windows cannot interfere with external window screens.

The brass threshold at the sill makes the installation perfectly weather proof, rattle proof and water-tight.

HARDWARE. Complete hardware, consisting of upper and lower tracks, storm thresholds, butt hinges, sash links, safety locks, sill stops, rubber stops, chafing plates, thumb or bow handle fasteners are furnished in requisite quantity for operating each series. Tracks and thresholds are solid brass; other parts are made in three finishes: solid brass, brass plated and dead black. Blue prints for the joiner are provided with each set.

It is like being out of doors with "Air-Way" equipped windows.



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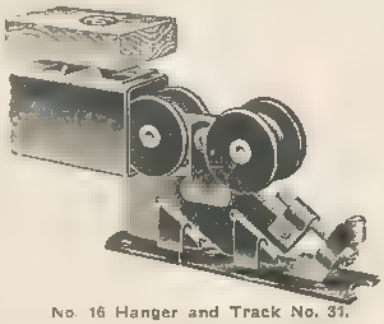
R-W VANISHING AND SLIDING DOOR HARDWARE

R.-W. disappearing or vanishing door hardware is adapted for use in residences for any type of opening where space saving is a factor, to separate living-room from dining room, to close openings between bedrooms, for breakfast-rooms, linen closets and stair halls.

The doors silently disappear into the walls on ball bearing, adjustable overhead hangers. They may be installed in pairs to slide into two walls or singly. They will never jamb or stick.

R.-W. vanishing door hardware comprises nine different sets of hangers of various weights and construction. No. 16 hanger, illustrated on this page, is ball bearing with fibre wheels and track No. 31, and is suitable for operating individual doors of 150 lb. weight. The hardware furnished with this and other sets includes the requisite quantity of track, hangers, brackets, floor guides, locks and bolts necessary for the complete operation of a set of doors. Track, hangers and brackets are finished in rustless dead black. Details of application are provided with each set.



No. 16 Hanger and Track No. 31.

R-W PARALLEL SLIDING DOOR HARDWARE

For doors weighing not more than 300 lbs. each, the illustrated hanger, with both vertical and lateral adjustment, running in R.-W. standard No. 31 track, meets the requirements for most parallel sliding doors that are from 1¾ to 2¼ in. thick.

OPERATION.—Two or three doors suspended according to the set on two or three runs of track, sliding from jamb to jamb or to wall space on one or both sides of the opening. Tracks are provided with brackets for wall or ceiling attachment. Single doors can be used with this type hardware.

Typical Ball-Bearing Hanger.

HARDWARE FURNISHED.—Is assembled in complete sets. These include the requisite number of tracks, brackets, hangers, floor guides, handles, etc., to fully equip the size opening specified. Owing to the various combinations which may be used with the sets, locks and bolts are not included. Molden, Weber & Co. Ltd. will be pleased to offer suggestions regarding the combination of bolts and locks.

TRACK ASSEMBLIES.—Rolled steel tracks used singly or in assemblies with weather strips in between. Finish, black enamel.

HANGERS. (1) Roller bearing with wheels of pressed steel. (2) Ball bearing with wheels drop forged. Finish black enamel.

R.-W. hardware for all sizes of wharf and warehouse doors weighing up to 3,000 lbs. each are available.

R-W LIFT DOOR EQUIPMENT

R.-W. lift door equipment is designed for super-excellent service, smoothness and noiselessness in operating single speed, two and three speed, and bi-parting doors. Good lift service cannot be maintained with inferior door hangers and closers. The advantages of high speed elevators may be lost if time must be wasted at each stop struggling with the doors. Lift doors equipped with R.-W. hardware close easily, noiselessly and completely with the one motion.

R.-W. hangers, closers, checking devices, safety interlocks are separate mechanisms, yet so constructed that they synchronise perfectly, forming a complete unit control.

HANGERS.—Evenly distribute the weight of the doors, and ensure smooth and silent operation.

CLOSERS. Designed to allow easy and rapid operation. Quietness is assured by an adjustable liquid check.

INTERLOCKS. Electric, electro-mechanical, or mechanical may be added to the above closers at any time without changing the closer mechanism.

ELEVATOR SIGNAL SYSTEMS.—All forms of signal systems from the simplest mechanical reset annunciator and dial indicator to the most complicated flashlight.

No. 827 Hanger and No. 743 Closer for Single Sliding Doors Weighing up to 200 lbs.

"OVER-WAY" TROLLEY TRACK CONVEYING EQUIPMENT

The "Over-Way" conveying equipment constitutes one of the most efficient labour-saving devices manufactured for any size factory or plant for handling loads up to 2500 lbs. This equipment not only saves labour, time and floor space, but can be designed to take up the conveying from the floor, leaving the aisles free and thus making possible the utilisation of the ceiling for storage space.

Installations consisting of from a few feet of track and one carrier to intricate curved systems with miles of track, many crossovers, switches, turntables and hundreds of carriers have paid for themselves in one year through reducing handling costs.

"Over-Way" Equipment Serving Two Dipping Tanks at one time; one Tank contains a light paint, the other a dark paint.

EQUIPMENT.—Includes overhead tracks, brackets, trolleys, carriers, hangers, switches, crossovers, turntables, and hoists. To ensure proper erection, detail drawings are furnished and all material marked to correspond.

INFORMATION REQUIRED.—On receipt of the following information, detailed drawings of equipment to meet requirements will be submitted for approval.

Always send sketch giving correct dimensions and proposed layout of tracks. State weight and size of maximum load, whether for constant or occasional use, and whether track will be used for storage purpose. Send details of overhead construction so proper brackets will be provided.

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LIPS

WM. BEDFORD LIMITED

476-490 LITTLE LONSDALE STREET
MELBOURNE

Australasian Agents for:
LIPS' SAFE AND LOCK WORKS LTD.,
LONDON AND HOLLAND

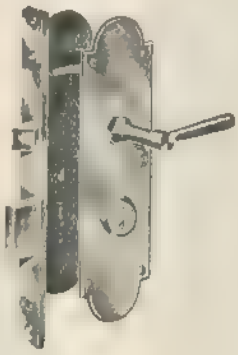
27*b*

For Other Products, See Index

LOCK DEPARTMENT

Mortise Cylinder and Lever Locks, for use with Lever and Knob Furniture; Padlocks, Garage Locks, Rim Locks, Sliding Door Locks, Espagnolette Bolts.

B 309/1230
3¼ x 5¾ x 1⅛ in.
Cylinder Rim Lock.



B 305/905. Extra Heavy Cylinder Mortise Lock. 11¼ x 6¼ x ¾ in. Plate Size, 17¼ x 3¾ in. Specially designed for Main Doors of Banks and other large Buildings.

B 306/906
Used in conjunction with B 305/905. Giving a security which can not be obtained by any other locking process

B 298/803
6¼ x 4 x ¾ in.
Mortise Front Door Lock.
The Ideal Front or Shop Door Lock.

B 321/913
3-in. Cylinder Padlock. Solid Gunmetal Lock Case, with Nickelled Shackle. Specially constructed for cases where an extensive system of master-keyed padlocks is required.

B 308/1092
Combined Locking Bar and Five-Lever Lock for Garage and Warehouse Doors.

Locking Bar 1092 is approved by the Accident Underwriters Association of Victoria

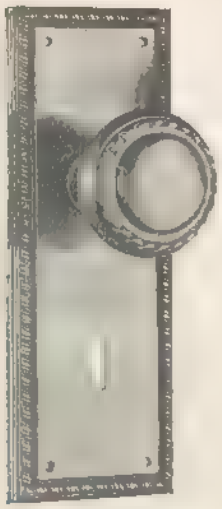
The Fire Brigade met with unexpected trouble, at a recent Melbourne fire, in having to hack through a door equipped with a 1092 Locking Bar

B 303/910
Mortise Sliding Door Lock. 5¾ x 3⅛ ¾ in.
For Internal and External Sliding Doors

(Continued on next page)

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

SOLID BRASS OR BRONZE DOOR FURNITURE



Australian-made Mortise and Rim Locks, Dead Locks, Rebated Mortise and Rim Locks, Lift Locks, etc.; Lock Furniture, Knobs and Lever Handles in brass and bronze

Wm. Bedford Limited manufacture a large variety of Locks, and all types are guaranteed indefinitely against defective workmanship or material.

They have a most comprehensive range of Lock Furniture (Plates, Handles and Knobs), and the craftsmanship on their Special Furniture is excellent

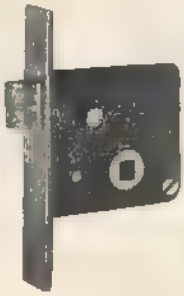
They make a feature of producing architects' designs of Door Furniture, etc.

They will gladly supply you, upon your application, with a copy of their comprehensive Catalogue, in which is devoted a large section to the large number of Locks and new designs for Door Furniture

B 201
7¼ x 2½ in.

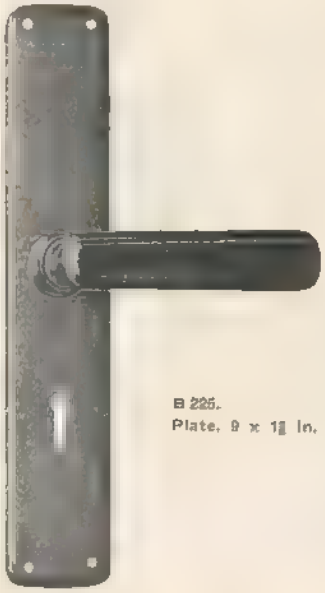
B 199
8 x 2¾ in.

B 264.
Mortise
Room Door
Latch Bolt
Reversible.
Depth of Mortise, 2¾ in
Height of Mortise, 2½ in.



B 262
Four Lever
Mortise Room
Door Lock,
For Lever
Handles Only
Depth of Mortise, 3 in.
Height of Mortise, 4½ in.

B 198. 11 x 2¾ in.



B 225.
Plate, 9 x 1¾ in.

B 259
Two-Lever
Mortise
Room Door Lock.
Suitable for all
Lock Set Furniture.
3¼ x 3¼ in.

B 195a.
Cast Brass
Mortise Lock-Set
Knob Size, 1¾ in.
Plate Size, 6¾ in.
x 2¼ in.

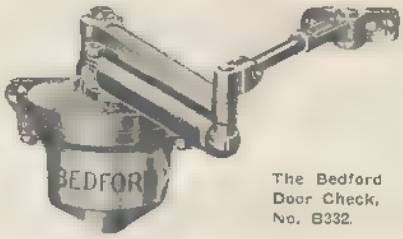
(Continued on next page

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

AUSTRALIAN-MADE DOOR CHECKS

Manufacture

The Bedford Door Checks are made from selected materials and will stand up to the strain of continuous use under most difficult conditions.



The Bedford Door Check, No. B332.

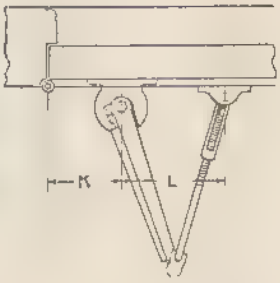


Fig 2.

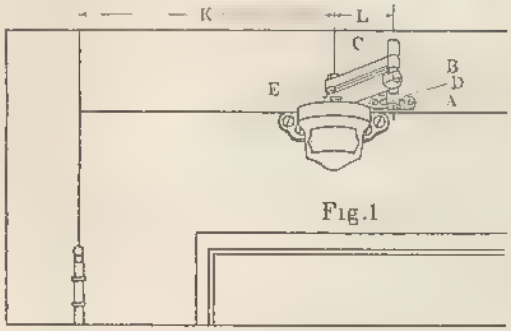


Fig.1

Fixing

When fixing the Door Check mark off the distances "K" and "L" in the tables below, which vary according to the size, number, cast on the bottom of each Check. Take care that the door style, on which the check must be fixed, is flat. Mark off position of screw holes, first seeing that the spring arm, "C," clears the door frame. If the door frame projects beyond the door and will not allow the check to clear it, place a block of wood of sufficient thickness between the check and the door. Fix the door check firmly and be sure that it is square on the door; attach the main arm hinge "A" (see fig. 1) to the door frame, in accordance with the distances "L" in the table below.

TABLE OF DISTANCES

Size	K	L
Check No. 2	6⅞ in.	2 in.
Check No. 3	6¾ in.	2¼ in.
Check No. 4	7⅛ in.	2⅜ in.
Check No. 5	8 1/16 in.	2⅝ in.

DUTIES OF BEDFORD No. 332 DOOR CHECK

Light Inner Doors	Size No. 2
Normal Inner Doors and Light Glass Doors	Size No. 3
Normal Outer Doors and Glass Shop Doors	Size No. 4
Heavy Outer Doors	Size No. 5

FLOOR SPRINGS

B 330

The distance from the centre of Pivot to rear edge of Floor Spring is only 2 in.

Bedford's Oil Check Floor Spring has a powerful compression spring, which operates centrally upon the pivot, so that pressure to the right or left is the same. Should the door be opened to slightly more than 90 degrees, it will remain open. A slight pressure is then sufficient to again bring the door back to its closed position. Bedford's springs are manufactured to fit into any class of floor.

With each Floor Spring an Upper Pivot, as illustrated, is supplied. This ensures easy fixing and obviates the necessity for hinges.

SIZES

Made in Two Sizes	Size
330/1—For Light Doors	9½ x 5½ x 3 in.
330/2—For Heavy Doors	11½ x 6½ x 4 in.

(Continued on next page)

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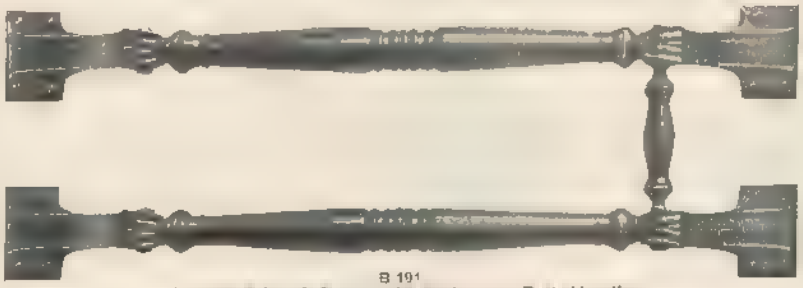
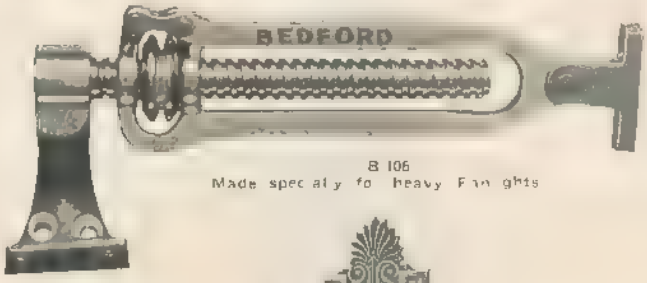
AUSTRALIAN MADE BEDFORD DOOR FITTINGS

CAST BRONZE PULL AND GUARD HANDLES



B 191
An example of fine workmanship in Pull Handles

ALL TYPES OF DOOR FITTINGS IN STOCK.



B 106
Made specially for heavy Fanlights

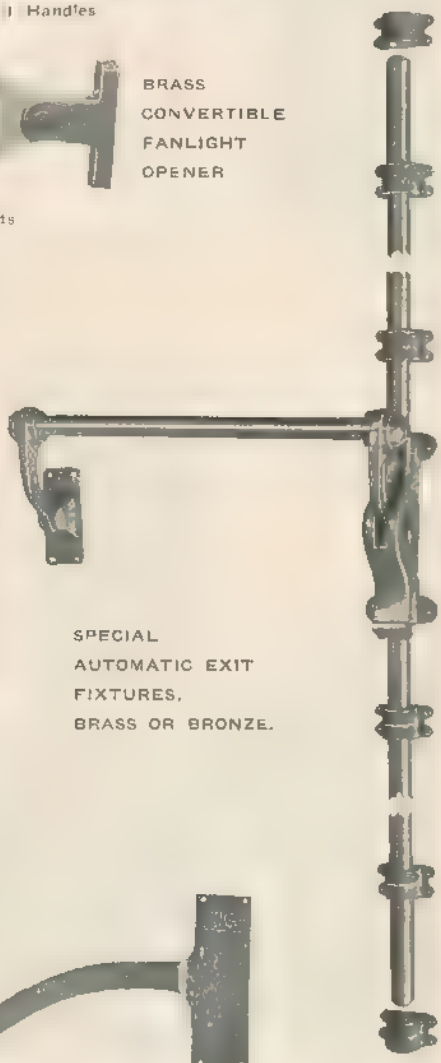
BRASS CONVERTIBLE FANLIGHT OPENER

B 81.
BRASS PANIC BOLT.

When ordering, state height of door.

B 160.
Plate 15½ x 3 in.

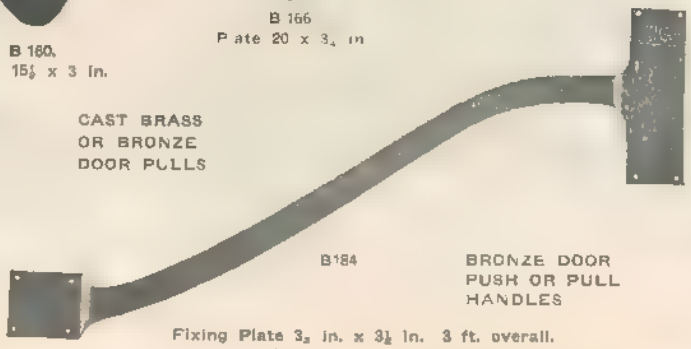
B 166
Plate 20 x 3¼ in



SPECIAL AUTOMATIC EXIT FIXTURES, BRASS OR BRONZE.

B 84.

CAST BRASS OR BRONZE DOOR PULLS



B184

BRONZE DOOR PUSH OR PULL HANDLES

Fixing Plate 3½ in. x 3½ in. 3 ft. overall.
Fixing Plate, 9 in. x 3 in.

(Continued on next page)

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

MOCK GATE, DOOR AND BOX HINGES

No. 1.
11 x 7 in.

No. 2.
8 x 2½ in.

No. 3.
10 x 7 in.

No. 4.
3 x 2 in.

No. 5.
14 x 4½ in.

No. 6.
17 x 7½ in.

No. 7.
20 x 5½ in.

No. 8.
21½ x 7½ in.

No. 9.
20 x 5 in.

B 343.
Foot Rail Standard.
For any size rail.

MANUFACTURED IN BRASS, BRONZE, OR RUSTLESS STEEL.

B 345.
Rail Support.

B 348.
Stair Hand Rail Bracket
For Wooden Rail.

HANDRAILS, RAIL STANDARDS AND BRACKETS.
BRASS, BRONZE, OR WROUGHT IRON.

For Complete Lists, See Catalogue.

B 351.
Stair Hand Rail
Bracket.

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

TYPICAL CAST BRONZE ORNAMENTS

(Continued from page 15b)

B 829
Window Transom Casting for Display Window

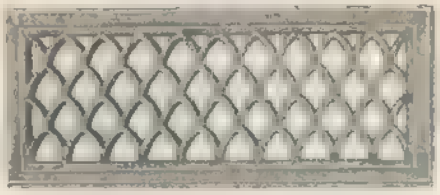
B 851
5½ in x 5½ in

B 847
4 in

B 845
4½ in

B 826
6 in x 2 in

Rosettes and Ornaments.
B 832.
8 in



Vents and Grilles
B 758
14½ x 6 inches.

Cast Bronze Letters
Manufactured in All
Sizes from ½ to 24 in.

B 753.
Any length, by 5 inches.

Embellishments in Metal Furnishings.

B 807.—1½ inches wide.

B 843.
½ in

B 842
1½ in

B 793.—1½ inches wide.
Moulding for Metal Doors, Tablets, etc.

For Representative
Designs See
Catalogue

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

SECTION N

[Containing S.A.A. Filing Section No. 29]

PLUMBING FIXTURES
—and—
PLUMBING

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

29*i*

SANITARY

RICHARD FOREMAN & SON LIMITED

WORKS AND OFFICES:

CHAPEL STREET, MARRICKVILLE

SYDNEY, N.S.W.

TEL. L 1473.

"FOREMAN"

Products

Foreman Standardised Flange Baths, Cast-iron Sinks, Cisterns, Soil and Rainwater Pipes and Fittings.

Quality

Only first class materials are employed in manufacture. Special machining and careful assembly of the products at all times maintains a quality and reliability which cannot be excelled

THE "FOREMAN" STANDARDISED FLANGED BATH

Standardisation

Means elimination of carrying large stocks of various patterns, simplicity of design and application in practice, greater efficiency in production and economy in service.

Advantages

The "Foreman" standardised bath can be built in any position, the tiling being executed below or above the flange; water is prevented from reaching the floor by the ridged flange

Workmanship

Manufactured by highly skilled and experienced tradesmen and executed under conditions where rigid supervision and careful inspection in all departments effectively maintain at all times high-class productions only

Finish

The finish, in pure white leadless porcelain enamel, resulting in a perfect lustre and faultless surface, is an assurance that only first-class materials are employed

Dimensions

The bath is made in one standard size only, viz., 5 ft. 6 in long by 2 ft. 6 in. wide; the centre of the plug-hole is 1 ft 3 in. and 1 ft. from the back and side flanges respectively.

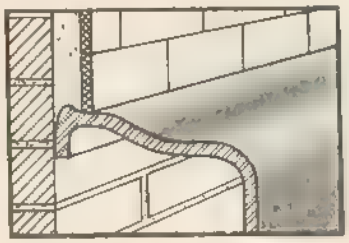
Simplicity of Application

Being so designed that it can be effectively placed to suit special requirements the "Foreman" bath can be installed in any position, including the centre of the bathroom. It is especially adaptable in hospital bathrooms, and fulfils all sanitary demands to the smallest detail

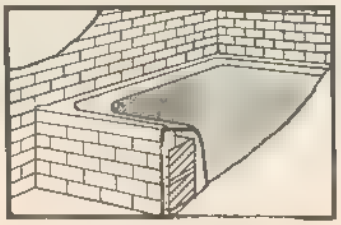
A Modern Bathroom Effect Obtainable with a "Foreman" Standardised Bath

Service to Architects

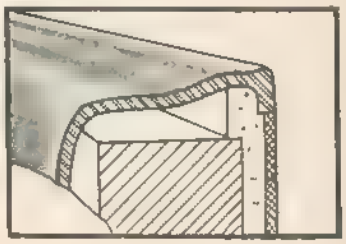
The accumulated information in regard to bath manufacture, resulting from many years of manufacturing experience, is at the disposal of the architect confronted with problems where a high-class product demands correct selection



Section Showing Method of Tiling to Wall.



Section Showing Bath Tub Built in Corner.



Section Showing Method of Tiling to Bath Front.

(Continued on next page)

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

"FOREMAN" STANDARD CAST IRON PIPES AND FITTINGS

Manufacture

All "Foreman" units are manufactured to fulfil the various functions connected with water and sewerage installations, and suitably perform a life and service in whatever capacity they are required.

Materials

Only the best materials of their respective kinds are used. Great care is exercised and maintained in the treatment and preparation of the various properties used, so that the maximum high standard of commercial production is produced.

Enamel Finish

To those who desire the highest form of sanitary finish we recommend the special faced internal bore glass enamelled pipe which is manufactured to resist rust or corrosive attack and to maintain a smooth internal wall surface. The enamel lining preserves the life of the pipe, allowing a perfectly clear passage offering no resistances to encumbrances which may pass through the pipe.

Standards and Range

All sections are manufactured to conform to the regulations as laid down by the Sydney Metropolitan Water, Sewerage and Drainage Board Standard.

The following table, together with the illustrated detail, covers the range of units used in the trades of "Plumber" and "Drainer." Special sections required to suit any demand can be produced.

SOIL PIPES AND FITTINGS.

Unless otherwise shown, pipe diameters are 2, 2½, 3, 4, 5, 6 in.

Soil Pipe:

6 ft. Socket and Spigot
4 ft. Socket and Spigot
3 ft. Socket and Spigot
2 ft. Socket and Spigot
6 ft. Double Socket

Bends:

Plain
Vented 2, 2½, 3, 4 in.—4, 5, 6 in.

Junctions

Plain.
Double
Inverted
Double inverted.
Unequal branches—2½, 3, 4, 5, 6 in.

Swan Necks or Offsets:

1½ inch—2 in. only.
3, 4½, 6, 9, 12, 15, 18, 21, 24 in. projections

Double Sockets or Collars:

With or without lugs.

Shoes

Reducing Sockets—

2½, 3, 4, 5, 6 in.

Pan Pieces and Short Connecting Pieces:

9, 12, 15, 18, 21, 24 in. projections—4 in. only.

Sanitary Branches for P. Traps.

9, 12, 15, 18, 21, 24 in. projections—4 in. only.

Sanitary Branches for S. Traps.

9, 12, 15, 18, 21, 24 in. projections—4 in. only.

Syphon Traps—

4, 5, 6 in.

Soil Pipe Vents, No. 55—

4 in. only.

NOTE.—Soil pipes and fittings made in the following degrees.—95, 105, 112½, 120, 135.

RAINWATER PIPES AND FITTINGS.

Unless otherwise shown, pipe diameters are 2, 2½, 3, 4, 5 in

Pipe—

6, 4, 3, and 2 ft. lengths.

Bends

Junctions:

Single.
Double.

Reducing Sockets—

3, 4 in. only.

Sockets or Collars

Shoes

Heads

Offsets:

1½, 3, 4½, 6, 9, 12, 15, 18, 21, 24 in. projections.

SQUARE AND RECTANGULAR PIPES AND FITTINGS—

4 x 3, 4 x 4, 5 x 3, 5 x 4, 6 x 4 in

6 ft. Pipes

Bends, Side and Forward

Shoes

Collars

Offsets, Side or Forward

3, 4½, 6, 9 in. projections.

Junctions:

Plain and Uneven Branches.

Heads

Brass access doors fitted on above fittings and pipes.

Footpath Boxes, Square Top.

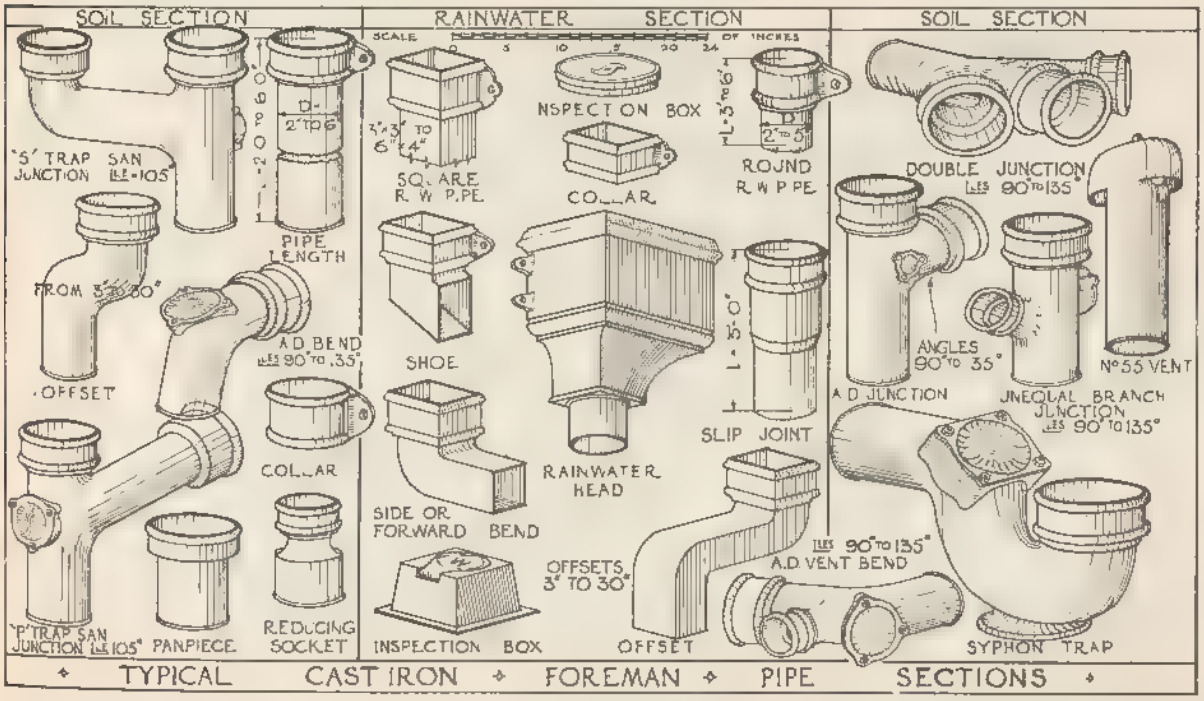
Inspection Boxes.

CISTERNS.

"Foreman" 2-gallon C.I. Cistern
"Foreman" 9-gallon C.I. Multiflush
"Foreman" 2 gallon Patent Air-Lock Syphon Cistern

NOTE.—The above cisterns are also available with internal enamel lining and external finishes of paint or white enamel. Bracket for Multiflush Cisterns can be supplied with a painted or white enamelled finish.

NOTE. Access doors to the above fittings can be supplied.



TYPICAL CAST IRON FOREMAN PIPE SECTIONS

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29h

S.A.A. File No.

A. E. ATHERTON & SONS PTY. LTD.

383 LATROBE STREET, MELBOURNE, VICTORIA

MANUFACTURERS OF "ATHENA" MIXERS, FLUSH VALVES AND COMPRESSION FITTINGS, CENTRIFUGAL PUMPS AND ENGINEERS' BRASSWARE

"ATHENA" Trade Mark

[For Other Products, See Index]

The "Athena" Mixing Valve

The "Athena" Valve mixes hot and cold water and discharges warm water at any desired degree of temperature. It is anti scalding, and is able to maintain a constant delivery temperature regardless of fluctuating pressures in the supply lines.

Features of Design & Construction

(1) The "Athena" mixer is ruggedly built of non-corrosive metals. It is of simple construction, with few working parts, consisting of a brass casting for the mixing chamber, a cam and two cartridge valves with rubber seatings. The rubber is the only wearing part, and can be replaced by the owner at a very small cost. There are no diaphragms nor thermostatic coils used.

(2) Any desired degree between the cold water and hot water supplies can be obtained at a touch, the cam operation being very light and positive.

(3) Accessibility to working parts is easily accomplished by removing the front plate. The only tool necessary for this purpose is an ordinary screwdriver.

(4) Dials and handles are heavily nickel-plated.

Models

"Athena" Valves are available in exposed or concealed models suitable for ½in., ¾in. and 1in. pipe connections, and adaptable to either bath or shower installations or as a combined supply to both.

Concealed

This model is for concealed piping. It is fitted with a nickel-plated cover piece and handle, which is designed so that it can be extended 12 in. or further through the walls.

Exposed

This model for exposed piping, has all exposed parts nickel-plated, and is obtainable with either circular or octagonal dials.

Operation

The cam is brought into operation by turning the handle to the right (Note It will only move in this direction so as to prevent scalding if handle was first turned through "hot" position), which opens the "cold" valve and allows the cold water to enter mixing chamber. Moving the handle to the "mixed" position, the cam opens the "hot" valve, and while still retaining the open position of the "cold" valve, allows the hot and cold water to be mixed before delivery is made to shower or bath. If a higher temperature is required, move the handle to the "hot" position and the cam will then gently slide off the "cold" valve and allow the full discharge of hot water

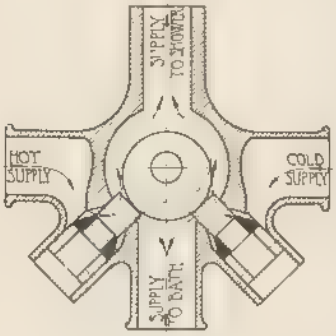
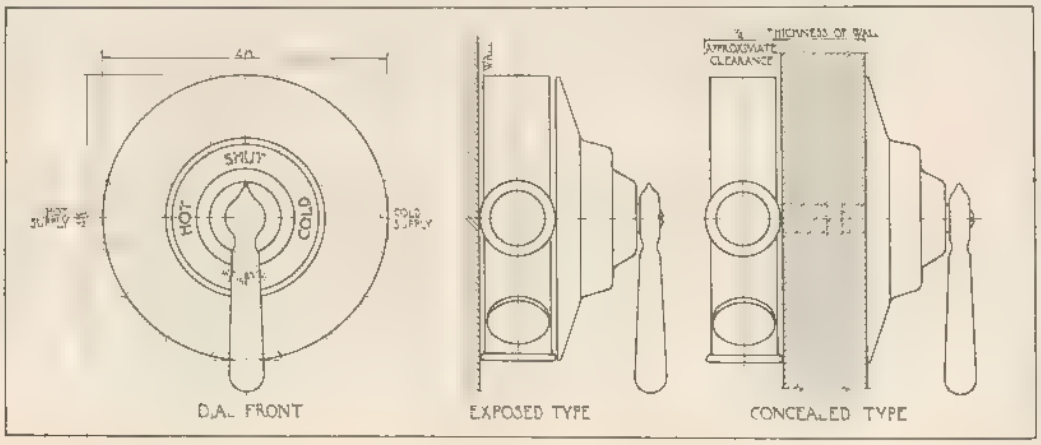


Diagram Showing the Principle of the "Athena"



Principal Dimensions of the "Athena" Exposed and Concealed Mixing Valve.

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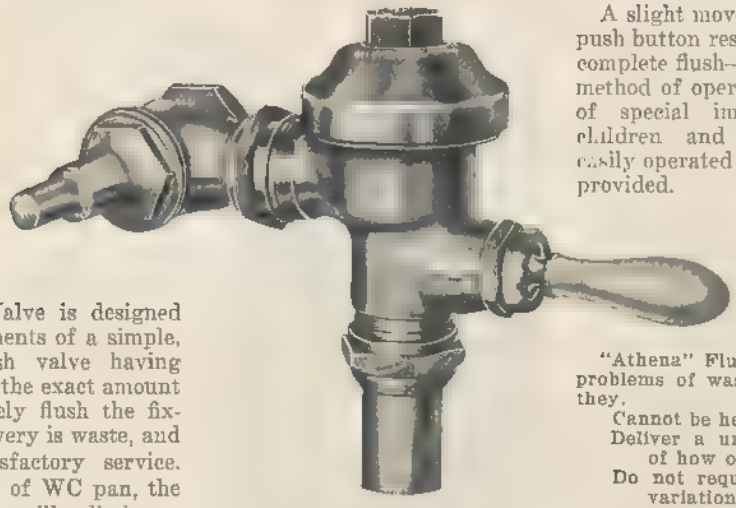
THE "ATHENA" FLUSH VALVE



A slight movement of the handle or push button results in a quick positive complete flush—no strength or special method of operation required. This is of special importance to women, children and invalids, for whom easily operated equipment should be provided.

Description

The "Athena" Valve is designed to meet the requirements of a simple, efficient, lasting flush valve having the ability to deliver the exact amount of water to effectively flush the fixture. Too much delivery is waste, and too little is unsatisfactory service. Used with any make of WC pan, the "Athena" valve will discharge enough water for a thorough flush—no more, and no less.

"Athena" Flush Valves overcome the problems of waste and service because they,

Cannot be held open to waste water;
Deliver a uniform flush regardless of how operated,
Do not require regulating for any variation of water pressure.

Detailed information concerning the extreme simplicity of the construction and operation of the "Athena" is set out below

HOW THE "ATHENA" OPERATES

The construction of the "Athena" Valve is extremely simple, as the diaphragm, auxiliary and main valve form a complete unit and constitute the only moving part, and this operates without friction. The metal used is a high-grade bronze, practically impervious to corrosion or wear

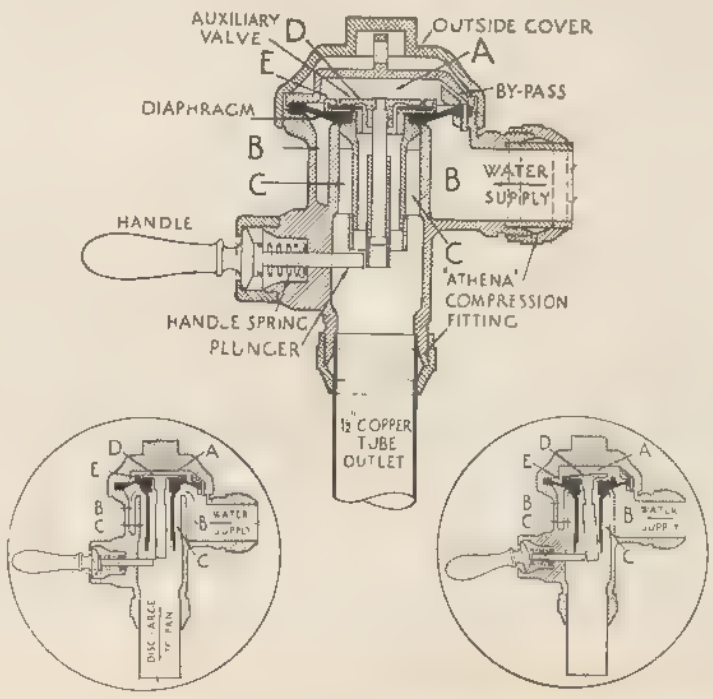
Fig. 1.—Shows the cross section of the flusher with its component parts. To follow the action of flushing, consider the upper chamber (A), the lower chamber (B), together with the by-pass connecting them, each filled with water originally supplied through the pipe connected with the source of supply and terminating at the chamber (B). A regulating stop valve (portion of the standard equipment supplied, but not shown in the section) controls the volume of the water to the chamber. The flow of water has now ceased, and Fig 1 shows the flusher previous to the operation.

Fig. 2 —The oscillation of the handle in any direction results in a forward horizontal movement by the finger, which tilts the stem of the auxiliary valve (D), causing the head of the valve to be unseated from its position on the top of the diaphragm (E). Water from chamber (A) is now released into the flush pipe, thus causing a decrease in pressure (A).

Fig. 3.—This decrease in water pressure permits the flexible diaphragm (E) to be lifted off the main body of water from (B) into the flush pipe (C), and so into the fixture. While the diaphragm remains in this position, water will continue to flow into the flush pipe

Note: The diaphragm is made of rubber, and is the only wearing part, whose average life is 10 years; it is readily interchangeable and can be replaced in a few minutes.

The By-Pass—Coincident with the auxiliary valve (D) being unseated, a jet of water from chamber (B) is forced through by-pass into chamber (A), this jet quickly builds up a water pressure in (A) and so shuts off the auxiliary valve The diaphragm then closes, and the flow of water ceases Thus the diameter of the by-pass controls the amount of flush, whether it be two gallons, 3 gallons, or more, as desired.



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THE "ATHENA" FLUSH VALVE EQUIPMENT

Styles

"Athena" Flush Valves are suitable for exposed or concealed installations Standard equipment includes nickel-plated "Athena" Flush Valve and Wall Flange. Unless otherwise specified, equipment will be as above. Chromium plated valves with china oscillating handles or push buttons can be supplied at a higher cost. "Athena" Flush Valves can be equipped in any of the following styles or combinations thereof When any of these styles are wanted, specify "Athena" flush valve, followed by the letters indicating the desired type

Stops

Style A: With angle stop—No extra cost

Style B: With straight stop—No extra cost

Inlets

Style C· With inlet on right hand side of flush valve—No extra cost.

Style D: With inlet on left hand side of flush vale—No extra cost

Style E: With inlet at back of flush valve—No extra cost.

Handles

Style F· With metal oscillating handle —No extra cost

"Athena" Flush Valve—Exposed Model applied to Pedestal Pan.

Style G. With china oscillating handle —No extra cost.

Style H. With handle on left side of flush valve —No extra cost

Style I: With handle on right side of flush vale—No extra cost

Style J: With handle in front of flush valve No extra cost.

Buttons

Style K· With metal push button—No extra cost.

Style L· With china push button—No extra cost.

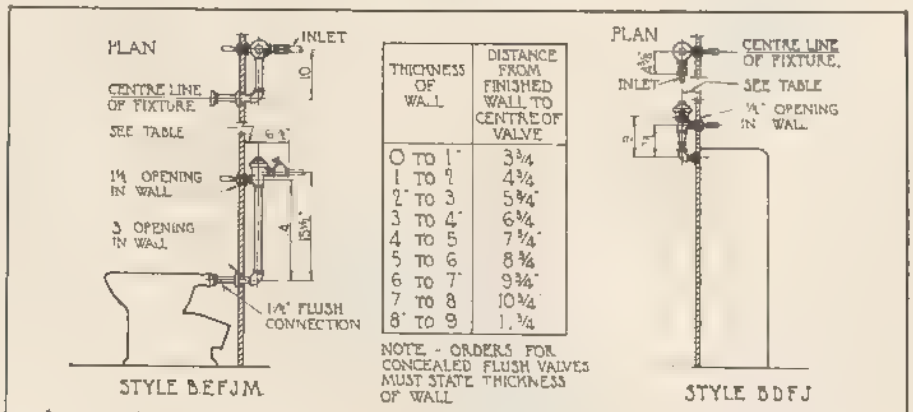
Flush Connections

Style M· With 1½ in. elbow flush connection Extra cost.

When specifying concealed "Athena" Flush Valves, state the thickness of walls. An extra charge is made for the concealed type.

New Closets.—1½-inch pipe from supply tank (which must be at least 10 ft. high above valve) to flusher Connection between flusher and closet is generally with a 1½-inch copper tube, all connected to suit the local authorities

Existing Closets.—No alteration need be made to the closet, providing that there is a 1½-inch pipe from supply tank to flusher.



THICKNESS OF WALL	DISTANCE FROM FINISHED WALL TO CENTRE OF VALVE
0 TO 1"	3¾
1 TO 2	4¾
2" TO 3	5¾"
3 TO 4"	6¾
4 TO 5	7¾"
5 TO 6	8¾
6 TO 7"	9¾"
7 TO 8	10¾
8" TO 9	1.¾

NOTE - ORDERS FOR CONCEALED FLUSH VALVES MUST STATE THICKNESS OF WALL

'ATHENA' FLUSH VALVE APPLIED TO STANDARD PEDESTAL PAN AND URINAL

Maintenance

Maintenance costs are reduced to a minimum in the "Athena," as the only wearing part is the rubber diphragm, which, when it occasionally does need replacement, can be made at a very low cost and in very short time by a plumber on the job With the piston type of flusher, renewals or adjustments can only be made by a competent engineer, who generally has to remove the valve and take it to his works, which means a very high repair bill. Also, cup leathers are not as lasting under water as a rubber diaphragm.

Installations

Installations can be done by any certified plumber The connection between flusher and the pipe which leads to the pan is made with compression joint, which means that the only tool necessary is a wrench to tighten nut

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

THE "HUSH" FLUSHER

JOHN DANKS & SON PTY. LTD.

MELBOURNE
391-403 BOURKE STREET
'PHONE: CENTRAL 8380

SYDNEY
324-330 PITT STREET

29 h

S.A.A. File No

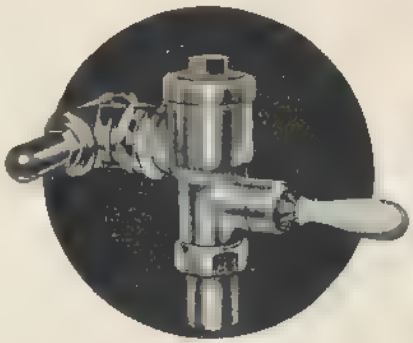
THE "HUSH" SILENT FLUSHER

(IMPROVED PATTERN)

An Efficient Flusher

It has been the desire of Sanitary Engineers for many years to design an efficient and silent Flusher that could be placed on the market at a price which would be within reach of all. The "Hush" Flusher provides a complete and satisfactory solution to this problem, and there should now be no reason why any internal W.C. should be without one

The "Hush' Flusher carries our carefully considered recommendation Over 2,000 of them have already been installed and are giving entire satisfaction.

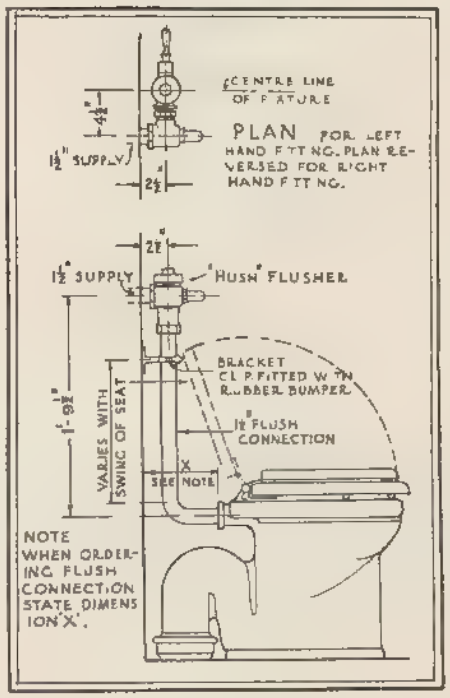


Construction Features

Accurately Machined. The "Hush" Flusher is made of high-grade metal throughout, and working parts are accurately machined to guaranteed standards of interchangeability, and are specially toughened to resist wear.

Interchangeability of Parts.—Close attention must be given to the great advantage of interchangeability, as it means a renewal part can be had from stock and fitted in a few moments The Flusher would therefore not be out of action at any time through having to be disconnected and sent out for repair or adjustment, as sometimes happens with other makes. There are no adjustments required, and any plumber can easily understand and fit or service the valve.

Only Two Moving Parts.—The valve is opened by a lever, and passes a given volume of water at each flush, according to the various Water Boards' regulations. There are only two moving units in the "Hush" Flusher, i.e., the lever and the valve. The lever unit is definite in action, and the valve unit, which controls the volume of water passed at each flush, is strongly constructed and cannot get out of order. The valve moves only half an inch at each flush, and will operate an unlimited number of times without variation.



Roughing-in Dimensions of a Typical "Hush" Flusher Installation.

Interior of Valve Easily Accessible.—By removing the cap only the whole of the interior of the valve is exposed for repairs. The risk of breaking any plumbing joint is therefore eliminated This advantage cannot be claimed by a number of other makers.

Neat Finish.—The "Hush" Flusher is neat in appearance and is nickel finished, and designed to eliminate square corners and irregular surfaces. These features are a great aid in easy cleaning.

10 Points of Superiority

1. Simple and foolproof construction
2. Neat in appearance, occupies but little space, and constructed for fitting on either hand.
3. Piston is loose fitting and cannot be held up by small pieces of foreign matter
4. Easily operated by moving handle in any direction
5. Regularity of flush
   Construction allows great volume of water to pass quickly but water is cut off gradually at end of flush thus allowing valve to seat quietly.
7. No pilot valves to leak
8. No regulating screws
   Efficient scour of pans.
9. Mechanically efficient, large bearing surfaces, wearing parts made of specially toughened hot pressed metal

Adaptability

The "Hush' Flusher can be changed in a few moments to either right or left fitting Handles from right to left as desired The Flusher can also be fitted behind the wall with press button only showing inside the room. This is a distinct advantage for institutional installations

Equipment

Standard equipment consists of "Hush" Silent Flusher, with regulating stop valve and china handle. All exposed parts are nickel-plated. "Hush" Silent Flushers equipped in the manner indicated by the following items in combination can be supplied.

Regulating Stop Valve. Suitable for either right or left hand fitting.

Handles. — China, Metal, Bakelite.

Press Buttons. — Metal or China.

Flush Connection (at extra cost).—1½ in. elbow flush connection with wall bracket clip fitted with rubber bumper.

Concealed Installations. — Orders for concealed models must state the thickness of the wall

Finishes

Unless otherwise ordered, all "Hush" Flushers will be supplied nickel-plated

Chromium plated "Hush" Flushers can be supplied at slightly increased costs. This finish resists tarnish and corrosion indefinitely.

Also available in industrial finish for industrial installations.

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

29b

S A A File No

JOHN DANKS & SON PTY. LTD.

MELBOURNE — 391-403 BOURKE STREET — 'Phone: Cent. 8380

SYDNEY — 324-330 PITT STREET

"TITON" — "DASPYL"

"TITON" COMPRESSION COUPLINGS

"Titon" Compression Couplings, [illegible] with copper tubing provide a [illegible] and [illegible] free hot water system. Copper tubing [illegible] of [illegible] is it was [illegible] and joined [illegible] by using "Titon" Compression Couplings. S.A.F. [illegible] of [illegible] disintegration, and is strong and enduring. Threading is eliminated, saving time and labour. In fact, the average plumber can make a copper pipe installation with 'Titon' Compression fittings quicker and more easily than any other type.

"Titon" Compression Couplings are of superior quality, and are the result of numerous tests and experiments to develop copper tube connections that would provide efficient service, long life and inexpensive installation.

As copper tubing can be bent to fit the work, a great saving is effected by the fewer couplings required. Every joint in a "Titon" Coupling is in itself a union connection.

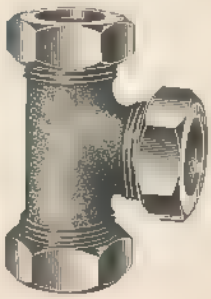


Fig. 614b.

TEE COUPLING.

Treble Nut All Ends for Copper Tube

Sizes ½ in., ¾ in., 1 in., 1¼ in., 1½ in., 2 in.

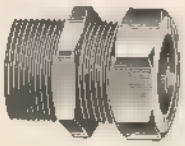
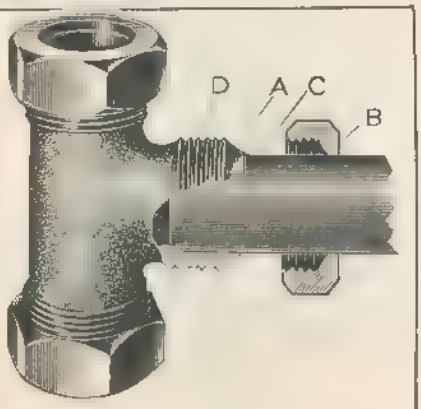


Fig. 611b.

STRAIGHT COUPLING.

Single Nut. For Copper Tube and Iron Pipe. Sizes: ½ in. Gas Male x ¾ in. Copper Tube, ¾ in. Gas Male x 1 in. Copper Tube, 1 in. Gas Male x 1¼ in. Copper Tube, 1¼ in. Gas Male x 1½ in. Copper Tube, 1½ in. Gas Male x 2 in. Copper Tube.



Principle of the Coupling

The advantage of the "Titon" Compression Coupling over other coupling is its special design, which ensures a perfect joint by simply tightening the nut. No loose rings (to be mislaid) nor packing required.

The principle of the "Titon" Compression Coupling is shown in the above illustration. The Nut B, by Threading on Fitting D, engages with Cone A. The curved internal shoulder in the Nut conforming to the angle of the Cone compresses the Cone into the Copper Tube C, making a Hermetic Joint. "Titon" Compression Couplings are made to match the bore of the copper pipe used, permitting the same full flow of water. The inside surfaces are neatly machined, enabling the water to pass as freely as through the copper pipe.

Note: All fittings are screwed Standard Gas Thread, and any end can thus be fitted direct to Wrought Iron Pipe socket if desired.

Fig. 612b.

STRAIGHT COUPLING.

Double Nut. Both Ends for Copper Tube. Sizes: ½ in., ¾ in., 1 in., 1¼ in., 1½ in., 2 in.

Copper Tubes for Compression Fittings

The following table will be of assistance when specifying the gauge of copper tubing suitable for use with compression fittings. The sizes are Australian Standards, and approved by the M.M.B.W.

External Diameter, Inches	Wall Thickness S.W.G.	Calculated Weight Lbs. per Lin. Ft.
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
1	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
3	[illegible]	2.83
3½	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]

Fig. 615b.

TEE COUPLING.

Treble Nut Reducing All Ends for Copper Tube.

Sizes: ¾ in. x ¾ in. x ½ in., ¾ in. x 1 in. x ½ in., 1 in. x 1 in. x ¾ in., 1¼ in. x 1¼ in. x ¾ in., 1¼ in. x 1 in.

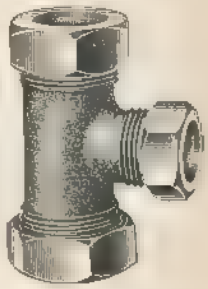
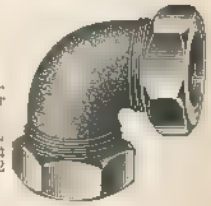


Fig. 613b.

ELBOW COUPLING.

Double Nut. Both Ends for Copper Tube. Sizes: ½ in., ¾ in., 1 in., 1¼ in., 1½ in., 2 in.



"DASPYL" PLUMBING SUPPLIES

Cocks:—
Ball
[illegible]
Fire hose
Gas
Stop
Tank

Valves:—
Back pressure
Check
Control
Disp
Gas
Gate

Traps:—
Brass
Gully
Hospital
Lead
Silt

Pipes:—
Cast Iron
Compo (Gas)
Copper tube
Downpipes (G.I.)
Hydraulic
Lead
Wrought Iron

Pipe Fittings:—
Bends
Caps
Crosses
Elbows
Flanges
Sockets
Tees
Unions

Miscellaneous:—
Hot Water Cylinders
Fire Hose and Fittings
Hose Racks
Garden Hose and Fittings
Centrifugal Pumps
Footpath Boxes
Water Meters and Covers
Gratings

Sanitary Ware:—
Baths—all patterns
Basins—Bracket
Pedestal
Bath Screens
Bath Heaters—Gas
Chip
Bathroom Accessories—Recess Fittings
Mirrors
Towel Racks
Paper Holders
Soap Holders
Medicine Cabinets

Cisterns—C.I. Enamelled
Drinking Fountains
Pedestal Pans
W.C. Seats
Sinks—Cast Aluminium
Cast Iron
Fireclay
Monel Metal
Washing Troughs and tubs

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Silva

TRADE MARK

R. H. MYTTON & CO.
PTY. LTD.

MANUFACTURERS

125 YORK STREET, SOUTH MELBOURNE, VICTORIA

TEL. M 1183

29h

S.A.A. File No.

Products

"Silva" Sinks, Metal Ceilings, Cornices, Mouldings, etc.; "Mytton" Skylights, Ventilators, Roof Cowls, Ventilating and Plain Ridging, Ceiling and Wall Vents, "Mytton" Glazing Bars; Copper, Brass, Bronze, Ornamental and Structural work of all descriptions built to specifications.

Service

Our representatives will submit details of any of our products on request and our Service Department is prepared to develop special designs or installations under the architect's instructions.

Guarantee

All "Mytton" goods are absolutely guaranteed against faulty workmanship; and any defects claimed to arise therefrom will be rectified immediately

Literature

Detailed special Catalogues, dealing with the several "Mytton" products, Brassware, "Silva" Sinks, Metal Ceilings, etc., are always available, and will be forwarded with pleasure to any persons desiring information.

"SILVA" KITCHEN EQUIPMENT

"SILVA" SINKS

Materials and Manufacture

"Silva" is the trade mark applied to all sinks manufactured by us. (The architect should clearly specify whether the sink is to be wholly of Monel Metal, Stainless Steel or White Metal).

Sinks are supported on rigidly constructed wooden frames — drainboards and skirtings (or splashbacks) are made of one piece of metal, the drainboards, having corrugated surfaces, are pitched to the basin, whilst the backs, of smooth-faced surfaces, are well carried up against the wall The basins have well-rounded, re-entrant angles, and are made for quick drainage, and the joints at drainboards are well sweated, the whole thus forming a watertight and non-fouling job.

Turned-up ends may be formed in the above construction also the back skirting may be boxed out, forming a ledge on top and a recess under to conceal pipes. Other ways of finishing the back provide a flange to turn-up back of wall tiles

Unless otherwise specified, all "Silva" Sinks will be supplied with the standard 4-inch skirting (or splashback) front and side apron and rolled edges. Monel Metal or White Metal plugs complete the fitment.

Advantages of "Silva" Sinks

In addition to the pleasant appearance which Monel Metal lends to all fittings of which it is an integral part, it also adds to "Silva" Sinks many other features—the one-piece back and draining-board and the elimination of all gaping joints between basin and drain-board absolutely do away with all possibility of the collection of dirt and grease at these points. Other distinct advantages over the old style of sinks are:—more resilient, thus eliminating breakage and chipping of fine china and crystal; no wash-up dish is required, since the basins are of convenient size and shape; non-stainable; do not chip, and are practically indestructible

Illustration. Double Sink and Drainer.

(Continued on next page)

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Standard Sizes

"Silva" Sinks are available in standard and special sizes as follows: -
Stock Sizes:—

Type "A"—4 ft. long x 1ft. 6in. wide. 5 ft. x 1 ft. 6 in., 6 ft x 1 ft. 6 in., fitted with standing flexible waste.

Type "B"—Same overall size as Type "A."

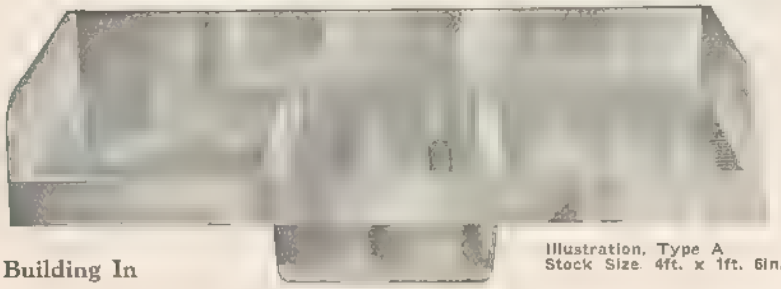
Type "C"—Single basin -4 ft. x 1 ft. 3 in
Double basin—5 ft 3 in. x 1 ft. 3 in.

Basins for Types "A" and "B" are each 15½ in. x 14½ in. x 8 in. deep, and for Type "C"—13¾ in. x 13½ in. x 8 in. deep.

Draining-boards to Type "A" and "B" are each 16 in. x 15 in and 16½ in. x 13¾ in for Type "C."

Illustration, Type B Stock Size, 4ft. x 1ft. 6in.

Illustration "Silva" Sink.
Built to Special Design.



Illustration, Type A
Stock Size 4ft. x 1ft. 6in.

Special Design

We are prepared to manufacture any style or size of sink to order, and to fit various recesses and corners, also butlers' pantry and hotel kitchen sinks.

In ordering "Silva" Sinks to be manufactured to a special design, please submit the dimensions "A" to "K" as set out in the Dimensional Drawing.

Building In

All sinks, whether standard or special, are built for quick and easy installation. In general, "Silva" Sinks are supported on light framing or fitted in over cupboards They may also be supported on wrought-iron brackets.

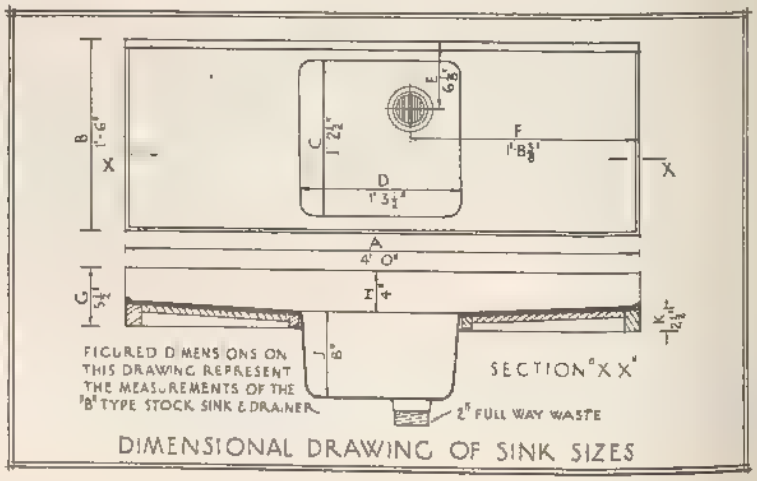
Table Tops, Cabinets, Food and Dish Warmers

Monel Metal makes an excellent table-top and may be successfully fitted over an old wooden table-top by means of a flange

Metal cupboards are also obtainable to fit under any sink made by us; they may be supplied with any number or arrangement of doors, and with built-in sections for food, or electric warmer, etc.

Specification

All sinks in . . or where indicated on plans, shall be wholly Monel Metal "Silva" Sinks as manufactured by R. H. Mytton & Co., and shall be of the following types and sizes



From the collections of Sydney Living Museums / Historic Houses Trust of NSW

MONEL METAL

A PRODUCT OF THE INTERNATIONAL NICKEL CO. INC

AUSTRALIAN DISTRIBUTORS:
FERRIER & DICKINSON LTD., 26 CLARENCE STREET, SYDNEY

VICTORIA AND TASMANIA.
H. Perks & Co. Pty. Ltd.,
31 Queen Street, Melbourne, C.1.

SOUTH AUSTRALIA:
Alwin Fisher Ltd.,
74-78 O'Connell Street, Adelaide.

QUEENSLAND
W. E. Peterman,
160 Edward Street, Brisbane.

WESTERN AUSTRALIA:
Harris, Scarfe & Sandovers Ltd.,
Hay Street, Perth.

15g

S.A.A. File No.

What Monel Metal Is

Monel Metal consists of approximately 67 per cent. Nickel, 28 per cent. Copper, and 5 per cent. other metals. In appearance it is very similar to pure nickel; it takes the same high finish, and has a slightly softer and somewhat more silvery lustre. It is strong, tough, ductile, and far superior to copper, gun-metal and bronze under corroding influences. It machines readily, and can be rolled, drawn, cast, forged, soldered, brazed, and acetylene or electrically welded. In rolled form, the metal has a tensile strength of 30 to 42 tons per square inch, according to size and treatment, e.g., whether in Rod, Strip, Wire or Sheet form.

The remarkable combination in the same alloy of a steel-like strength and a high resistance to corrosion, has led to the use of Monel Metal in many fields where it has had to withstand numerous corroding agencies under varying conditions of temperature, concentration and immersion.

Monel Metal is a natural alloy in that it is produced from its ore without separating the constituent metals. The ore is mined, smelted, and refined in Canada, under technical control by the International Nickel Co.

Special Value of Monel Metal

This arises from the combination of several qualities, each of great importance in itself:

1. A high tensile strength exceeding that of mild steel.
2. Extreme toughness, equal to that of wrought iron.
3. The proportion of strength retained at high temperatures.
4. A complete resistance to the corrosive action of brine and impure waters, atmospheric conditions, alkalies, and a high resistance to many acids.
5. The facility with which it can be worked by ordinary engineering processes.
6. The varied forms in which it is readily available.
7. A highly ornamental and decorative appearance combined with durability and cleanliness.
8. The non-tarnishing properties of this metal are an attractive feature in its use for decorative metal work.

Resistance to Corrosion

Owing to the varying conditions under which metals are used in chemical operations, it is misleading to give definite figures for corrosion as obtained in the laboratory. Under practical working conditions, Monel Metal has been proved resistant to most acids and alkalis in common use, but it should be noted that Monel Metal is not recommended for the following:—

Chromic Acid	Perchloric Acid	[illegible]
Nitric Acid	Mercuric Chloride	[illegible]
Picric Acid (hot)	Phosphoric Acid (hot)	[illegible] Solution
Copper Sulphate		

PHYSICAL PROPERTIES OF MONEL METAL

Colour: White
Melting Point: 1,360 deg. C. [illegible]
Specific Gravity: 8.80
Weight per cubic inch: [illegible]
Coefficient of Thermal Expansion per degree C.—
(25 deg. C. - 100 deg. C.)—0.00014
[illegible] C. -300 deg. C. [illegible]
[illegible]
Electrical Resistivity—256 ohm-mil-foot, 42.5 microhm-cm
Electrical Conductivity: 4 per cent. of that of Copper
Coefficient of Electrical Resistivity: 0.0013 per deg. C.

Optical Reflectivity: 60 per cent. of that of Silver
Heat Conductivity: 0.06 C.G.S. Units (1/15 of that of Copper)
Specific Heat—(20-1,300 deg. C.) 0.127 cal. per gram per C.
Magnetic Induction at 100 gausses:
Cast Metal—500 gausses.
Rolled Metal: 1,000-1,500 gausses
Modulus of Elasticity (Youngs)—25,000,000
Torsional Modulus: 9,500,000
Izod Test: 100 ft. lb. on standard specimen.
Resistance to alternating stress in rotating beam machine approx. 100,000,000 alternations at proportional limit.

(Continued on next page)

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How Obtainable as Raw Material

Monel Metal can be obtained from Australian stocks, as under

Wire (hot rolled and cold drawn), Rounds, Flats and Hexagons
Sheets from 10—26 gauge
Solid Drawn Seamless Tube.
Rivets: Flat and Round Head
Monel Ingot for Castings, also
Monel Shot for Foundry use
Magnesium Stick for deoxidation in Monel castings
Welding Rods—Plain and coated with deoxidising compound

Escutcheon Pins and Nails
Pure Nickel can be obtained as under —
Sheets, 20—24 gauge
Pellets and Grade F Shot for Foundry use.
Chrome Nickel available also in sheets 20 and 23 gauge.

Uses When Made Up

Monel Metal equipment is easily kept clean with soap and water, and is not injured by alkalies or chemical polishing compounds. It is entirely free from the limitations of plated goods; it is solid throughout, and its appearance improves with use.

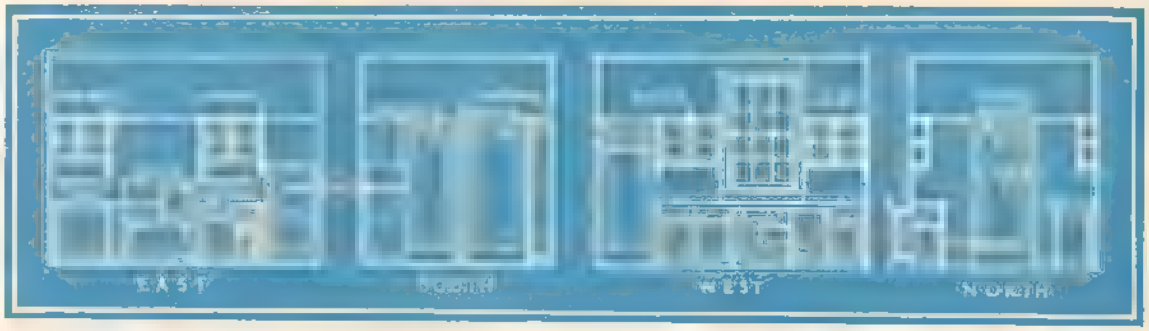
Monel Metal is easily distinguishable from other non-ferrous nickel-alloy metals of similar appearance—Monel Metal is magnetic

Utilise the inherent qualities of Monel Metal by specifying it for equipment where resistance to heavy wear and tear and corrosion has to be combined with highly ornamental and attractive appearance, as for Skylight Frames, Fly Screens, Metal Finishings, Roofing and Flashings, Ventilating Equipment, Ornamental Hardware, Kitchen Hospital and Cafeteria Equipment

For the above, Monel Metal meets these requirements better than any other available metal, and effects substantial economies both in care and maintenance.

THE BASIC KITCHEN PLAN

A Practical Study in the Scientific Planning of an Efficient Kitchen



Kitchen Planning

The [illegible] which so often [illegible] room as well as [illegible] for preparing meals is now considered not to be well adapted to the modern home. For a convenient and compact workshop, the kitchen dimensions should provide a total area that will accommodate necessary equipment and leave comfortable working space for the worker.

The rectangular floor space is best proportioned to save time, steps and effort. It provides two long walls, one for the preparation process, the other for the clearing away process, and offers an easy work track across the short dimensions.

Size has a direct relation to the number of persons served, the number of kitchen workers, and so forth. Good proportions are

7 x 10 ft.—one worker kitchen—serves 2-5 persons.

8 ft. 6 in. x 12 ft. 6 in.—one worker kitchen—serves 5-8 persons

10 x 14 ft.—one worker kitchen—serves 8-12 persons.

12 x 16 ft.—two worker kitchen serves 10-16 persons

14 x 20 ft. two worker kitchen—serves 10-25 persons.

Two Main Processes

There are two main processes in any kitchen and each covers distinct equipment.

Process A—
(MEAL PREPARATION)

1. Pantry, Refrigerator or Ice Chest and Food Cupboards.
2. Table or working space for preparation
3. Range or cooking appliances.
4. Serving Table or Service Tray.
5. Sink for water supply and preparation.

An Efficient Grouping of Kitchen Equipment.

A—Preparing Route.
B—Clearing Away Route.
M—Where Monel Metal should be used.

Process B
(CLEARING AWAY)

1. Stacking space for soiled dishes, etc., table, dumb-waiter or sink drain board.
2. Sink—with maximum working area
3. Drain board for clean dishes and utensils
4. Cupboards and shelves for dish and utensil storage.

The ideal placement is that in which equipment is so grouped that in preparing meals, the worker brings the food from the pantry, refrigerator or any other storage cupboard, to the work table, prepares it and cooks it and sets the finished dishes on the serving table. The refrigerator, pantry and food storage cupboards, therefore, should be near the rear entry for receiving supplies. The preparation table should be placed between the range and refrigerator with any extra cupboard space for food storage close at hand. The serving table is best placed near the range near the dining room door

For clearing away, the sink should be conveniently located in relation to the dining room, and in a cross position to the cooking range so as to permit easy access to the water supply.

Monel Metal in the Kitchen

Monel Metal is rust proof, corrosion resisting, solid clean through with no coating to chip, crack or wear. Its beauty is distinctive, modern and practical. Monel Metal, therefore, is the most serviceable material for sinks, table tops, range hoods, kick and push plates on doors, and a host of other kitchen equipment subject to [illegible] impacts and corrosion and abrasion. Its use assures spotless cleanliness and long life of the equipment.

Other Points for Improving Kitchen Efficiency

Rational Lighting, Scientific Ventilation, [illegible] Power and Light Inlets.

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

HUME

HUME STEEL LTD.

Manufacturers of Electrically-Welded Steel Pipe, Concrete Lined and Welded Structures

Head Office:
"KINNEAR HOUSE," Cr. KING & LITTLE COLLINS STS., MELBOURNE. Tel. C.10754

Branch Offices:
South Australia, Mile End, Keswick. Te. L.5142-3.
West Australia: Subiaco. - Tel B.3642.
New Zealand: 8 Quay Street, Auckland. Tel. 46-271.
N.S.W: Commercial Road, Rozelle, Sydney.
Queensland: Montague St., South Brisbane Tel. J.1442-3-4.
Tasmania: Cr. Dunn & Macquarie Streets, Hobart. - - - - Tel. 1670.
Branches also in Singapore.

29b

S.A.A. File No.

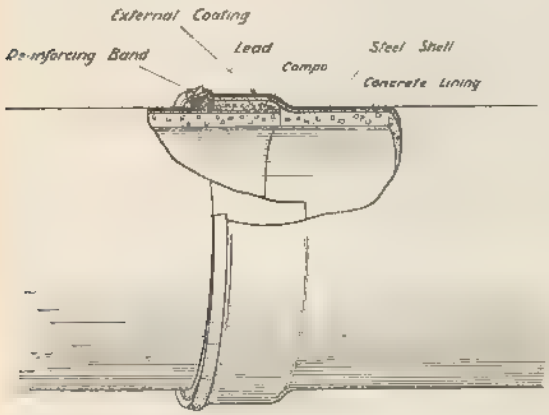
MILD STEEL CONCRETE LINED PIPES

Method of Manufacture

The Pipes are formed from Mild Steel Plates, the joining edges being butt welded by the "Hume" Electric Arc Welding process. The Mild Steel Plates (unless otherwise specified) have a tensile strength of 24 to 28 tons per square inch, with an elongation of not less than 20 per cent. "Hume" Covered Electrodes are used.

The Faucet is expanded on the end of the pipe, and is reinforced with a mild steel ring. The illustration shows details of end joint.

External Coating.—The pipes are externally coated with hessian and a mixture of bitumen and tar, which is "built" on to the Pipe by an improved process. The "Hume" external coating has now become standard throughout Australia.



Standard Lead and Yarn Joints may be made or, alternatively, Cement Compo and Lead Joints are adopted.

Internal Lining

The Pipes are internally lined with cement concrete by the "Hume" centrifugal process. The thickness of the lining varies from one half inch to two inches, according to the diameter of the Pipe.

Sizes

The Pipes are manufactured in diameters of 4 in. upwards, and are especially designed for the various services for which they may be required.

Guarantee

Hume Steel Limited are able to guarantee their welded joints to be 100 per cent. efficient, with an elongation in the deposited metal of from 10 per cent. to 20 per cent. as may be required.

Tests

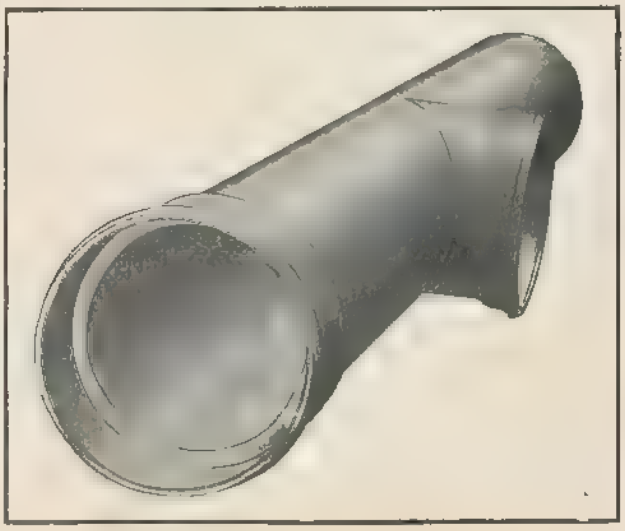
To show the efficiency of the Concrete Lining, a 9¼ in. diameter Steel Pipe, manufactured from $\frac{3}{16}$ in. mild steel plate, was lined with a $\frac{1}{16}$ in. thickness of cement concrete. The steel was perforated with holes varying from half inch to one inch in diameter. The Pipe was then set up for hydraulic testing, and the pressure was gradually raised to 950 lbs. per square inch, which was the limit of the pressure gauge. The pressure was held for five minutes without change. This test conclusively showed that the Pipe would continue to give good service, even though, after a number of years, the steel shell had become perforated, due to corrosion or other causes.

Quotations

Special Pipes of any shape, and suitable either for faucet or flanged joints, are manufactured as required. Write for further literature and information. Quotations should always be demanded, both for standard work or special requirements. Prices vary considerably according to the service for which the Pipe is to be used, and, as all Pipes are made to order, the quantity of Pipes required, regulates the price to some extent.

Prominent Installations

Hume Steel Limited are Contractors to the Melbourne and Metropolitan Board of Works, Melbourne; Metropolitan Water Sewerage and Drainage Board, Sydney; Metropolitan Water Supply Department, Brisbane, Adelaide, Perth, Hobart and New Zealand; State Rivers and Water Supply Commission, Victoria; Irrigation Department, Adelaide; Irrigation Department, Brisbane; Goldfields Water Supply Department, Perth, also Country Water Trusts and Authorities throughout Australia.



Faucetted Branch.

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29b

S.A.A. File No.

STATE MONIER PIPE AND REINFORCED CONCRETE WORKS

[Late Gummow, Forrest & Co. Ltd. Established 1897]

HEAD OFFICE: 8-14 BOND STREET, SYDNEY — Tels.— B 3891 B 5883

Works: Macdonald Street, ERSKINEVILLE

Works: Smart Street, CARRINGTON (NEWCASTLE). Newcastle 79

Address All Enquiries to Box 3388 R, G.P.O., SYDNEY

CONCRETE PIPES

[For Other Products, See Index]

Products

Our manufactures comprise Monier Circular and Oviform Reinforced Concrete Pipes, Centrifugally Spun (Hume) Reinforced Concrete Pipes, Reinforced Concrete Garden Rollers, Incinerators, Splayed Pipes and Tidal Flaps, Pile Armour, Plates, etc., and Septic Tank Installations, see page 29C2.

Manufacture

Reinforced Concrete Pipes are manufactured in circular and oviform sections of great variety for use in the construction of sewers, storm-water channels, culverts, etc., also "in situ" pipe constructions

Quality and Strength

Reinforced Concrete Pipes are manufactured and guaranteed to be of a standard of strength to pass all requirements of Public Works Department and Main Roads Board, but they may be made and guaranteed to suit other requirements if so required. They afford a maximum of velocity and discharge due to the uniformity of section and the smoothness of their internal surfaces.

The pipes are guaranteed to be perfectly sound and straight with a smooth internal surface To have ends true planes square to axis of pipe or splayed to suit radius of curve ordered.

3ft. 6in. Diameter Reinforced Concrete Pressure Pipe Line.

Durability

Monier Pipes have been in use in Sydney for over 30 years and show no signs of deterioration

Junctions

Junctions are only made to order. The fact that Monier Pipes are provided with a base makes an interchange of right and left hand junctions impossible. It is therefore of the utmost importance that junctions required be stated correctly, and for that purpose we ask that they be ordered invariably looking down stream.

Splayed Pipes

Very uniform curves can be produced by means of straight pipes if they be splayed to suit the respective radii. These splayed pipes can be manufactured to order to suit any given radius and length of curve measured along the centre line. Splayed pipes are laid and jointed in the ordinary way. Radius should not be less than six times diameter of pipe.

Short Pipes

In addition to the standard length of 6 ft. for Centrifugally Spun and 3 ft. 7 in. for Monier Pipes, we manufacture short pipes of any length required to order.

Laying and Jointing

The pipes are manufactured without spigot and faucet to permit of easy handling and close and rigid stacking, both desirable conditions for the prevention of breakages. Monier Pipes are provided with a flat base. Monier and Hume Pipes are usually jointed by means of a bandage of Cement Mortar reinforced by Wire Netting, called a Bandage Joint, a method of jointing pipes which fulfils its purpose under all ordinary conditions.

Other methods of jointing more costly than the former need only be resorted to in exceptional cases, such as pipes situated in ground liable to settlement or heavily charged with water, in which case a collar joint has been found to answer admirably. Collars are manufactured to order

Special Pipes for Pressure Mains

These pipes are manufactured by the Centrifugal Process and have proved satisfactory under quite high pressures. They are not kept in stock, but made to suit special conditions. Advice and quotations will be given as required.

Special Pipes with Tidal Flaps

Wherever low-lying grounds are to be drained into tidal waters it is necessary to make provision for the exclusion of the latter. For this purpose we manufacture special pipes of various diameters with Tidal Flaps attached, both of Reinforced Concrete. This type of Tidal Flap has found great favour on account of the permanent nature of the materials and the excellent fit. Other pipes may be jointed on to the special pipe to form a drain through the embankment between the low-lying ground and the tidal waters

Pile Armour

Reinforced Concrete Pile Armour protects timber piles driven in tidal waters from the ravages of Teredo Navalis and other marine borers. We manufacture tubular Pile Armour of full and half sections of varying diameters. Full section Pile Armour with Bandage Joint and Collar Joint are employed in new structures, when they can be slipped over the pile after the operation of driving, while the half section is employed for the encasing of piles of existing structures where the former method of armouring is inapplicable. Large quantities of the two types of Pile Armour are in use and have proved themselves easy of application, of good appearance, and a most reliable and permanent protection. Full particulars are obtainable on application.

(Continued on next page

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Cement Lining

The practice of Cement Lining Cast Iron and Welded Steel Pipes has rapidly increased in the last two years. The use of Cement Mortar lining prevents corrosion on the internal surface of the pipe and also provides a smooth and uniform surface. We have cement lined considerable quantities of pipes for the Public Works Department, Metropolitan Water, Sewerage and Drainage Board, and also the Hunter District Water Supply and Sewerage Board, and will quote for any work of this description.

Service to Architects and Engineers

We are prepared to design and construct, in collaboration with Architects, Reinforced Concrete Buildings, Bridges, Roads, Silos, Water Supply and Sewerage Schemes, also fabrication of Mild Steel Bars for Reinforced Concrete Works.

TECHNICAL INFORMATION TABLES

Circular Monier Pipes

Inside Diameter of Pipe		Length of Pipe		Discharge Area	Approximate Weight per Lineal Foot.			Weights by Rail Approximate Weight per Pipe			Weights by Boat Approximate Cubic Tonnage per Pipe.
ft	in	ft	in	sq ft	cwt	qrs.	lbs.	cwt	qrs	lbs.	cu tons
[illegible]	6	3	7	0 78	0	2	3	1	3	14	10
1	6	3	7	1 77	0	[illegible]	6	2	[illegible]	14	23
1	9	3	7	2 41	1	0	2	3	2	14	30
2	0	3	7	3 14	1	0	27	4	1	21	38
2	6	3	7	4 91	1	3	0	6	1	6	58
3	0	3	7	7 07	2	0	26	8	0	6	81
3	6	3	7	9 62	2	3	17	1[illegible]	1	14	1 1[illegible]
4	0	3	7	12 57	3	2	2	12	2	[illegible]	1 40
4	6	3	7	15 90	4	0	25	15	0	[illegible]	1 76
5	[illegible]	3	7	19 64	4	3	21	17	3	21	2 15
6	0	[illegible]	7	28 27	6	3	15	24	2	21	3 09

Oviform Monier Pipes

In Inside Dimensions of Pipes				Length of Pipe		Discharge Area	Approximate Weight per Lineal Foot			Weights by Rail Approximate Weight per Pipe			Weights by Boat Approximate Cubic Tonnage per Pipe
ft	in	ft	in	ft	in	sq ft.	cwt	qr	[illegible]	cwt.	qr.	lb.	cu. tons
[illegible]	[illegible]	3 x	10	3	7	[illegible] 81	0	2	1	1	3	7	11
1	6 x	1	1	3	7	1 24	0	2	26	2	2	14	17
1	9 x	1	4	3	7	1 77	0	3	24	3	1	21	24
2	[illegible] x	1	6[illegible]	3	7	2 42	1	0	2[illegible]	4	1	21	32
2	6 x	[illegible]	0	3	7	3 17	1	2	2	5	1	21	41
2	9 x	1	11[illegible]	3	7	4 03	1	[illegible]	7	6	2	0	52
3	3 x	2	2	3	7	5 21	2	0	17	7	2	21	65
3	6 x	2	1	3	7	6 09	2	2	25	9	[illegible]	0	77
[illegible]	6 x	3	0	3	7	9 19	3	1	2	11	2	0	1 07
4	3 x	3	3	3	7	10 61	3	2	2[illegible]	12	3	22	1 21
4	6 x	3	6	3	7	12 14	4	0	10	14	[illegible]	16	1 38

Hume Patent Centrifugal Pipes

Manufactured at Carrington, Newcastle.

Inside Diameter of Pipe.		Length of Pipe.		Discharge Area	Approximate Weight per Lineal Foot			Weights by Rail Approximate Weight per Pipe		
ft.	in.	ft.	in.	sq. ft.	cwt.	qrs.	lbs.	cwt.	qrs.	lbs.
1	3	6	0	0 22	0	2	25	4	1	10
1	6	6	0	1 77	1	0	1	6	0	7
1	9	6	0	2.41	1	1	0	7	2	1
2	0	6	0	3.14	1	2	2	9	0	13
2	6	6	0	4.91	2	0	13	13	2	25
3	0	6	0	7 07	2	3	7	16	3	12
3	6	6	0	9.62	3	1	19	20	2	3
4	0	6	0	12.56	4	0	8	24	1	24

Pipes may be obtained in 4 ft 3 ft and 2 ft lengths to order

Hume Patent Centrifugal Pipes

Manufactured at Monier Works, Erskineville.

Inside Diameter of Pipe		Length of Pipe		Discharge Area	Approximate Weight per Lineal Foot.			Weights by Rail Approximate Weight per Pipe.			Weights by Boat Approximate Cubic Tonnage per Pipe
ins		ft	ins	sq ft.	cwt	qrs	lbs	cwt	qrs	lbs	cu tons
9		6	0	0 44		1	10	2	0	0	105
12		6	0	0 78		1	26	3	3	17	173
15		6	0	1 22		2	25	4	1	10	270
18		6	0	1 77	1	0	1	6	0	7	387
21		6	0	2 41	1	[illegible]	0	7	2	1	508
24		6	0	3 14	1	9	2	[illegible]	0	13	652

Special Pipes with Tidal Flaps

Inside Diameter.		Weights by Rail. Approximate weight of Pipe, Flap and Accessories.				Weights by Boat. Approximate Cubic Tonnage per Pipe, Flap and Accessories.
ft.	ins.	tons	cwt.	qrs.	lbs.	cubic tons
1	6		3	3	7	0.35
1	9		4	3	18	0.46
2	0		6	0	0	0.55
2	6		8	1	21	0.81
3	0		10	2	14	1.11
3	6		13	2	7	1.47
4	0		16	2	14	1.87
4	6	1	0	0	7	2.32

Prices

Prices of pipes, etc., can be obtained on application to our Head Office, 8-14 Bond Street, Sydney.

Freights

On New South Wales Government Railways:—
Under 1 ton—1st Class rates.
1 ton and under 6 tons—"C" Class rates.
In 6-ton lots per 4-wheeled truck—"B" Class rates.

By Coastal and Interstate Boats. Rate per ton of 40 cubic feet, or deadweight, whichever be most favourable to the shipping company.

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29b

S.A.A. File No.

HUME PIPE CO. (AUST.) LTD.

Head Office.
"KINNEAR HOUSE," Cr. KING & LITTLE COLLINS STS., MELBOURNE. Tel C.10754

Branch Offices:

South Australia: Mile End, Keswick. Tel. L.5142-3
West Australia: Subiaco. - Tel. B.3642.
New Zealand. 8 Quay Street, Auckland. Tel. 46-271.
N.S.W.: Commercial Road, Rozelle, Sydney.
Queensland: Montague St., South Brisbane. Tel. J.1442-3-4.
Tasmania: Cr. Dunn & Macquarie Streets, Hobart. - - - - Tel. 1670.

Branches also in Singapore.

HUME

Hume Concrete Pipe

The Hume Concrete Pipe is moulded by centrifugal action and results in a very dense, strong, impervious concrete, affording the best possible protection to reinforcement. The concrete, on account of its density, is much less subject to attack and more resistant to attrition and wear than ordinary concretes. By the Hume Patented Process, Centrifugally Spun Concrete Pipes are manufactured for drainage, sewerage, culvert and water supply works.

Electrically Welded Double Grid Reinforcement

We have pleasure in announcing that we have adopted a new type of electrically-welded reinforcement in connection with the manufacture of our Culvert Pipes. The new process enables us to make a very efficient and accurate **Double Grid Reinforcing Cage**, which has considerable advantages. Formerly, when designing pipes to withstand heavy external loads, the practice was to make a slightly ovalled reinforcement. The manufactured pipe was then marked to show the placement of the reinforcement, and it was necessary to lay the pipe in the trench in the exact position as marked. The adoption of the double reinforcing cage avoids that necessity. The pipe with the new design of reinforcement may be placed in the trench **in any position**, which results in a **saving in handling charges.**

Sewerage, Drainage and Culvert Pipes

CULVERT PIPES—Supplied in 4 ft. lengths, sizes 9 in. to 75 in. Sizes 9 in. to 21 in. with butt joints; 24 in. to 75 in., flush joints—for internal jointing.

DRAINAGE AND SEWERAGE PIPES—Supplied in 6 ft. lengths, sizes 4 in. to 12 in., and 8 ft. lengths, sizes 15 in. to 75 in. Sizes up to 21 in. spigot and faucet, 24 in. to 75 in., flush joints—for internal jointing.

Sizes 4 in. to 21 in. are also available with plain ends for bandage joints.

Non-reinforced Concrete Pipes are also manufactured 4 in. to 9 in. in 3 ft. lengths; 12 in. to 21 in. in 4 ft. lengths. Joints, spigot and faucet.

HYDRAULIC PIPES—These pipes are supplied in 6 ft. lengths, 4 in. to 9 in., and 8 ft. lengths, 12 in. and over.

Steel Collars are supplied for jointing, and a number of lead and yarn joints are used to allow for expansion and contraction.

Representative Installations

HYDRAULIC

Maryborough Waterworks Trust—1st Contract: 52,000 feet of 12 in. Reinforced Concrete Pipes and Steel Concrete-Lined Pipes. Pressure up to 400 feet head. **2nd Contract:** 22,300 feet of 15 in. Reinforced Concrete Pipes, 260 feet head.

Beaufort Waterworks Trust—1st Contract: 39,000 feet of 6 in. Reinforced Concrete Pipes, 150 feet to 250 feet head. **2nd Contract:** 15,000 feet of 9 in. Reinforced Concrete Pipes, 150 feet to 260 feet head.

SEWERAGE

Melbourne & Metropolitan Board of Works, 1920/1933. Annual supplies of 4 in., 6 in. and 9 in. Sewerage Pipes. Hume Pipe Co. (Australia) Ltd. secured Contract again this year for Concrete Pipes. Over 200 miles of Concrete Sewerage Pipes 4 in. to 24 in. diameter have been supplied to this Board since 1920.

Ballarat Sewerage Authority, 1922/1932.—Over 200,000 ft. of Concrete Sewerage Pipes supplied to the above authority during the last ten years.

Geelong Waterworks & Sewerage Trust, 1920/1932.—150,000 ft. of Concrete Sewerage Pipes supplied to above authority during the last twelve years.

Echuca Sewerage Authority, 1929.—62,000 ft. of 4 in., 6 in. and 9in. Concrete Pipes were supplied in the sewering of Echuca.

Mildura Sewerage Authority, 1930.—42,000 ft. of 6 in., 9 in., 12 in. and 15 in. Concrete Sewerage Pipes were supplied in the sewering of Mildura. Approximately two-thirds of House Connection Fittings also supplied in Concrete.

Devonport Sewerage Authority, Tasmania, 1932.—At present 54,000 ft. of 4 in., 6 in., 9 in. 12 in., 15 in., and 18 in. Concrete Sewerage Pipes are being supplied.

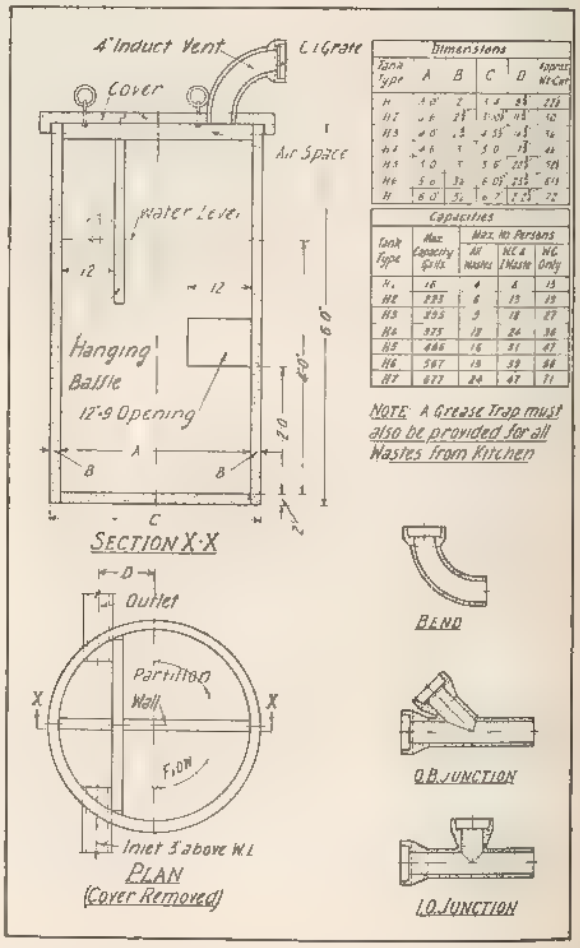
Warrnambool Sewerage Authority, Victoria, 1932. Hume Pipe Co. (Australia) Ltd. has just signed Contract for supply of 117,000 ft. of 6 in., 9 in., 12 in., 15 in. and 18 in. Concrete Pipes for sewerage of Warrnambool.

DRAINAGE

Many thousands of feet of large-sized Drainage Pipes have been supplied to Melbourne & Metropolitan Board of Works and Suburban Councils, sizes 30 in. to 75 in. diameter, the latter being the largest size Concrete Pipes made in Victoria.

Hume Septic Tanks

For sewage disposal systems adapted to individual buildings, the greatest efficiency is obtained by the use of septic tanks, and the disposal of the sewage effluent from these tanks by filtration through the ground by means of agricultural tile drains or soakage wells. Hume Septic Tanks are moulded similar to Hume Concrete Pipe, all reinforced. They are easily installed; installation being only a matter of levelling up. Simple instructions are furnished for installation, or we will install the complete plant, including all drain pipes and pits, etc.



Dimensions					
Tank Type	A	B	C	D	Approx. Wt. Cwt.
H1	3 0"	2	1 4	2 3	2 3
H2	3 6	2 3	1 5	2 3	3 0
H3	4 0	2 3	1 5	2 3	3 6
H4	4 6	3	1 6	2 3	4 0
H5	5 0	3	1 6	2 3	5 0
H6	5 0	3 6	6 0	2 3	6 0
H7	6 0	3 6	6 7	2 3	7 0

Capacities				
Tank Type	Max. Capacity Gals.	Max. No. Persons		
		All Wastes	W.C. & 1 Waste	W.C. Only
H1	16	4	6	13
H2	233	6	13	19
H3	295	9	18	27
H4	375	12	24	36
H5	466	16	31	47
H6	567	19	39	58
H7	677	24	47	71

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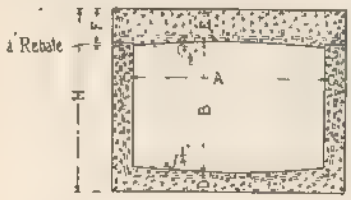
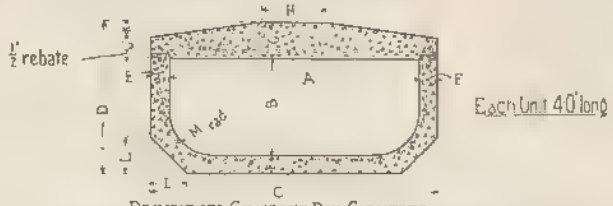


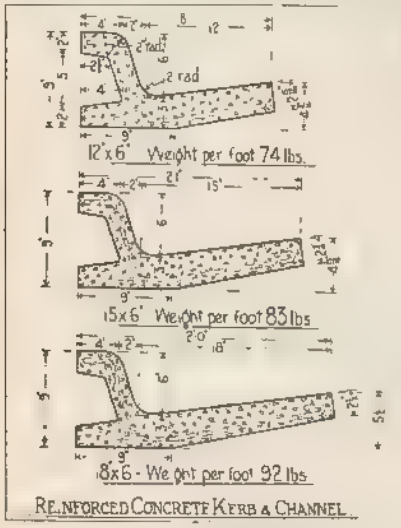
REINFORCED CONCRETE BOX CROSSINGS

Size	Wt per ft lbs. Footpath Traffic	Road Traffic	A	B	C	D	E Footpath Traffic	Road Traffic	F Footpath Traffic	Road Traffic	G	H Footpath Traffic	Road Traffic
12 x 4	80	95	12	4	½	½	2	3	2½	3½	15½	7¼	8¼
12 x 6	87	100	12	6	½	½	2	3	2½	3½	15½	9¼	10¼
15 x 4	19	17	15	4	2	2	2	3	2½	3½	19	8	9
15 x 6	120	135	15	6	2	2	2	3	2½	3½	19	10	[illegible]
15 x 9	130	139	15	9	2	2	2	3	2½	3½	19	13	14
18 x 4	129	153	18	4	2	2	2	3	2½	3½	22	8	9
18 x 6	136	160	18	6	2	2	2	3	2½	3½	22	10	[illegible]
18 x 9	162	186	18	9	2	2	2	3	2½	3½	22	13	14
18 x 12	191	215	18	12	2	2	2	3	2½	3½	22	16	17



REINFORCED CONCRETE BOX CULVERTS

Size	24" x 4"	24" x 5"	24" x 6"	24" x 9"	30" x 4"	30" x 5"	30" x 6"	30" x 9"	36" x 4"	36" x 5"	36" x 6"	36" x 9"	36" x 12"	36" x 15"	36" x 18"	36" x 21"	36" x 24"	36" x 27"	36" x 30"	48" x 4"	48" x 5"	48" x 6"	48" x 9"	48" x 12"	48" x 15"	48" x 18"	48" x 21"	48" x 24"	48" x 27"	48" x 30"	48" x 33"	48" x 36"
A	24"	24"	24"	24"	30"	30"	30"	30"	36"	36"	36"	36"	36"	36"	36"	36"	36"	36"	36"	48"	48"	48"	48"	48"	48"	48"	48"	48"	48"	48"	48"	48"
B	4"	5"	6"	9"	4"	5"	6"	9"	4"	5"	6"	9"	12"	15"	18"	21"	24"	27"	30"	4"	5"	6"	9"	12"	15"	18"	21"	24"	27"	30"	33"	36"
C	2.5"	2.5"	2.5"	2.5"	2.5"	2.5"	2.5"	2.5"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	4.5"	4.5"	4.5"	4.5"	4.5"	4.5"	4.5"	4.5"	4.5"	4.5"	4.5"	4.5"	4.5"
D	16"	15"	22"	21"	27"	26"	31"	29"	32"	29"	30"	29"	30"	29"	28"	25"	25"	29"	28"	32"	32"	31"	32"	31"	32"	31"	32"	31"	32"	31"	32"	31"
E	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"
F	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"
G	5"	5"	5"	5"	5"	5"	5"	5"	5"	5"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6½"	6½"	6½"	6½"	6½"	6½"	6½"	6½"	6½"	6½"	6½"	6½"	6½"
H	9"	9"	9"	9"	9"	9"	9"	9"	9"	9"	9"	9"	9"	9"	9"	9"	9"	9"	9"	9"	9"	9"	9"	9"	9"	9"	9"	9"	9"	9"	9"	9"
J	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"
K	4"	4"	4"	4"	4"	4"	4"	4"	4"	4"	4"	4"	4"	4"	4"	4"	4"	4"	4"	4"	4"	4"	4"	4"	4"	4"	4"	4"	4"	4"	4"	4"
L	4½"	4½"	4½"	4½"	4½"	4½"	4½"	4½"	5"	5"	5"	5"	5"	5"	5"	5"	5"	5"	5"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"
M rad.	5"	5"	5"	5"	5"	5"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"
lbs per ft	250	270	285	305	310	305	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]



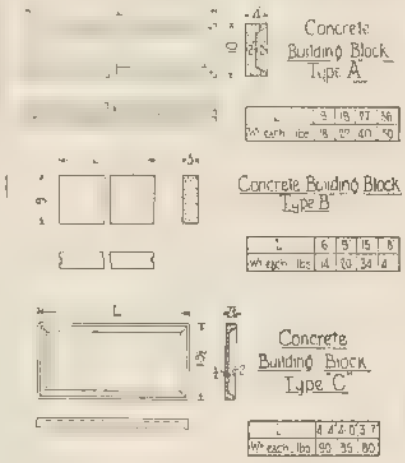
REINFORCED CONCRETE KERB & CHANNEL

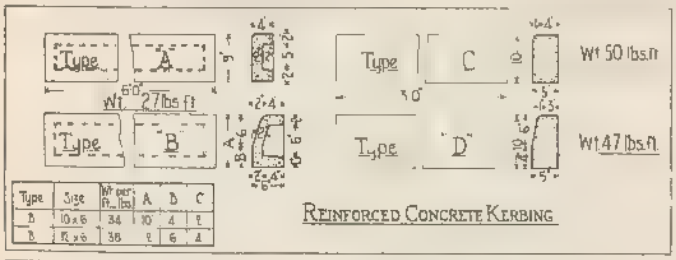
HUME CONCRETE PRODUCTS.

Using the same degree of care and workmanship as expended in the manufacture of Hume Concrete Pipes, a complete range of pre-cast paving and building units is also produced by the same company.

In specifying, use the following clauses.—

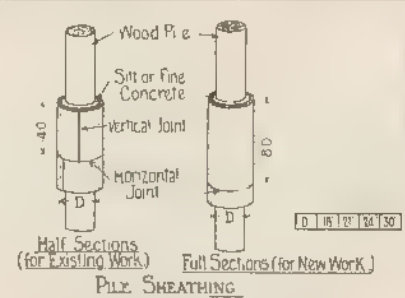
"All pre-cast concrete kerbing (or box crossings, or combined kerb and channel), (or building block, or wall units), (or paving slabs), shall be of Hume Pipe Company manufacture, or equal, and of the following sizes ( ), or, (as set out on plans)."



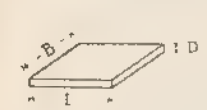


Type	Size	Wt per ft lbs	A	B	C
B	10 x 6	34	10"	4	2
B	12 x 6	36	2	6	4

REINFORCED CONCRETE KERBING



PILE SHEATHING



Type	L	B	D	No per sq. yd	Wt per sq. yd
A	18	9	1½	8	162 lbs.
B	9"	9	1	16	162
C	5	4½"	1½	32	162
D	24	24	2	2½	216
E	24	18	2	3	216
F	24	12"	2	4½	216
G	12"	12"	2	5	216

CONCRETE PAVING SLABS.

SPECIAL PRE-CAST UNITS.

We shall be pleased to undertake the manufacture of any special pre-cast units according to customers' requirements. We are specialists in compressed concrete slab manufacture, all work being done by patented machinery, giving absolutely dense concrete throughout. Slabs for drives or footpaths may be had in various colours. Prices on demand.

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

29c

S.A.A. File No

STATE MONIER PIPE AND REINFORCED CONCRETE WORKS

[Late Gummow, Forrest & Co. Ltd. Established 1897]

HEAD OFFICE: 8 14 BOND STREET, SYDNEY

Works: Macdonald Street, ERSKINEVILLE.

Works. Smart Street, CARRINGTON (NEWCASTLE). Newcastle 79

Address all enquiries to Box 3388R, G.P.O., Sydney.

Tels.— B3891 B5883

SEPTIC TANKS

[For Other Products, See Index]

Product

The manufacture of Monier Portable Septic Tanks and Aerators producing the most favourable living conditions for the micro-organisms required in the septic treatment of sewage has been our aim and, judging from the great number of successful installations in use, we may well claim to have succeeded. To meet the varying requirements of our clients we manufacture installations capable of treating the sewage of households numbering from three to seventy persons, or more, if necessary

General Points

In all cases of septic installations, with or without aerators, the most suitable position compatible with local conditions must be selected to enable the discharge of the effluent in the cheapest and most favourable manner. If the ground has a slope, the installation should be arranged so as to discharge the effluent at the surface of the ground so that it may run into surface drains to soak into the soil or to be used for irrigation purposes. If the ground be flat the installation must necessarily be underground, and the effluent must be discharged into underground drains of rubble or perforated pipes to soak into the subsoil or to be collected into a tank, if required for irrigation purposes, in which case the liquid will have to be lifted by mechanical means to the surface of the ground.

As the micro-organisms subsist on the sewage, it is apparent that the latter must contain the necessary substance for their well-being, and to ensure the proper working of the installation, the discharge of the W.C., the house and kitchen slops, bath and laundry water, should all pass through same. A too concentrated or too diluted sewage are alike unsuitable.

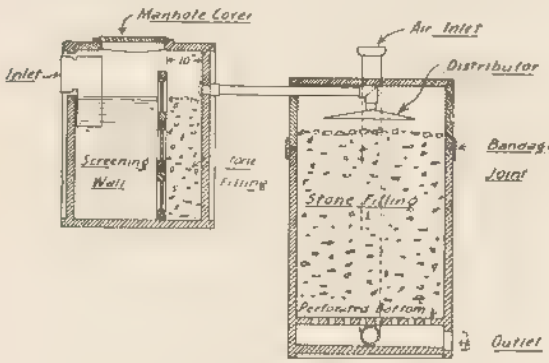
Disinfectant must be strictly excluded. Only sanitary paper should be used in the W.C.

Size of Installation

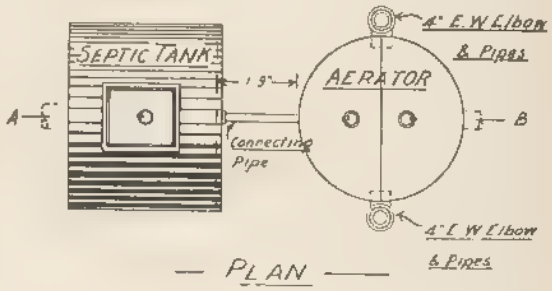
The capacities of our Septic Tanks are based on a water consumption of 20 gallons per head per diem, an ample provision for households

In the case of factories where provision has only to be made for the discharge from the lavatories, a consumption of 10 to 12 gallons per head per diem is sufficient allowance, consequently the number of persons specified for each size of our Septic Tank may be increased proportionally. For satisfactory working, the contents of tank should be completely changed in a period of from 12 to 48 hours.

It is advisable to adopt size of tank to meet usual requirements, especially as the provision of 20 gallons per head per diem for our Septic Tanks permits of a temporary increase in the number of persons from 10 to 20 per cent. without detrimental effect. Our Stock Aerators are 6 ft. 5 in. high overall, giving a depth of filter bed of 4 ft. 6 in. They are supplied in two sections, necessitating a bandage joint.



— SECTION AT A B —



— PLAN —

Permits for Septic Tank Installations

In order to safeguard the interests of the general public, the local authorities have been entrusted with the supervision of private biological treatment works. It is, therefore, necessary to make application to the respective Municipal or Shire Councils or other authorities for permission to make such installations, and submit designs and particulars for their approval.

To assist our clients in this matter, we forward on application, free of charge, the necessary drawings and particulars of our Stock Installations with and without Aerators, to accompany their application for Septic Installation.

(Continued on next page)

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

Specification of Materials Used in Connection with a Septic Installation

The stone filling in Septic Tank and Aerator should consist of clean, hard, broken stone, of a gauge not less than 2½ in. The cement grout to be a mixture of cement and water.

The cement mortar to be composed of one part of cement to two parts of clean, sharp sand.

The concrete to be composed of one part of cement, two parts of sand and three and a half parts of ¾ in. to 1 in. gauge broken stone or gravel.

Materials Supplied

With each Septic Tank, irrespective of size or number of sections, we supply Screening Wall, Manhole Cover, and E.W. Inlet Junction.

With each Aerator we supply Reinforced Concrete Cover Plate in two sections, G.I. Connecting Pipes, G.I. Distributor, Induct Piping, with two E.W. Elbows for same, and two Gratings for Induct Pipes.

SIZES AND CAPACITIES OF STOCK SEPTIC INSTALLATIONS

No. of Persons to be Served	Allowance per head per diem in Gallons.	Number of Septic Tanks.	Diameter of Septic Tanks.		No. of Sections 3ft. 7in. long per Septic Tank.	Length of Septic Chamber per Tank.		Capacity in Gallons.	Number of Aerators.	Diameter of Aerators.		Total Area of Aerating Bed.	Depth of Aerating Bed.	
			ft.	in		ft	in			ft	in	sq. yds.	ft.	in
3	20	1	3	0	1	3	0	64	1	3	6	1.07	4	6
5	20	1	3	6	1	3	0	96	1	3	6	1.07	4	6
6	20	1	4	0	1	3	0	128	1	3	6	1.07	4	6
8	20	1	4	6	1	3	0	160	1	3	6	1.07	4	6
13	20	1	3	6	2	6	7	256	2	3	6	2.14	4	6
17	20	1	4	0	2	6	7	352	2	3	6	2.14	4	6
23	20	1	4	6	2	6	7	464	2	3	6	2.14	4	6
29	20	1	4	0	3	10	2	576	3	3	6	3.21	4	6
35	20	1	4	6	3	10	2	704	3	3	6	3.21	4	6
46	20	2	4	6	2	6	7	928	4	3	6	4.28	4	6
57	20	2	4	0	3	10	2	1,152	6	3	6	6.42	4	6
70	20	2	4	6	3	10	2	1,408	6	3	6	6.42	4	6

Erection

The erection of Septic Tanks and Aerators as supplied by us can easily be done by any intelligent workman with the help of the drawings we supply, but, as a licensed plumber is necessary for the house connections, etc., it is as well to have the whole work carried out by him

Freights

On N.S.W. Government Railways. Under one ton, first class rates; one ton and under six tons, "C" class rates; in six-ton lots per four wheeled truck, "B" class rates

By Coastal and Interstate Boats Rate per 40 cubic feet, or dead-weight, whichever be most favourable to shipping company

MONIER SEPTIC TANKS

Number of Persons	Number of Septic Tanks.	Number of Sections 3ft. 7in. long in each Septic Tank.	Diameter of Septic Tanks.		Weights by Rail — Approximate Weight per Septic Installation with Accessories.			Weights by Boat — Approximate Cubic Tonnage per Septic Installation with Accessories.
			ft	in	tons	cwt.	qrs.	Cubic Tons
3	1	1	3	0	0	12	1	1 0
5	1	1	3	6	0	16	0	1 3
6	1	1	4	0	0	19	2	1 6
8	1	1	4	6	1	5	1	2 0
13	1	2	3	6	1	6	0	2 4
17	1	2	4	0	1	11	2	3 0
23	1	2	4	6	1	19	1	3 8
29	1	3	4	0	2	3	1	4 5
35	1	3	4	6	2	13	1	5 5
46	2	2	4	6	3	18	2	7 5
57	2	3	4	0	4	6	2	8 9
70	2	3	4	6	5	6	2	10 0

MONIER AERATORS

Number of Aerators.	Depth of Aerator Bed.		Weights by Rail — Approximate Weight per Aerator and Accessories.			Weights by Boat — Approximate Cubic Tonnage per Aerator and Accessories
	ft	in	tons.	cwt.	qrs.	Cubic Tons.
1	4	6	1	[illegible]	2	2.5
[illegible]	4	6	2	15	0	5.0
3	4	6	4	2	2	7 5
[illegible]	4	6	5	10	[illegible]	10 0
[illegible]	4	6	8	5	0	15.0

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

29*d*

S.A.A. File No.

GEO. W. KELLY & LEWIS PTY. LTD.

Engineers

Office
COLLINS HOUSE, 360 COLLINS STREET, MELBOURNE.

Works:
SPRINGVALE, VICTORIA.

Sole Representatives:

N.S.W.: Alfred Snashall Ltd., 85 Pitt Street, Sydney

S.A.: E. Treliving, T.T. Buildings, Light Square, Adelaide.

QUEENSLAND: Waugh & Josephson Ltd., 102-104 Melbourne St., South Brisbane.

W.A.: Atkins (W.A.) Ltd., 894 Hay Street, Perth.

K-L

[For Other Products, See Index]

Products

Standard belt and motor driven Centrifugal Pumps, types N, L and H; split casing double suction belt and motor driven Centrifugal Pumps; solid casing double suction belt and motor driven Centrifugal Pumps; split casing single suction multi-stage Centrifugal Pumps; split casing turbine multi-stage Centrifugal Pumps; solid casing turbine multi-stage Centrifugal Pumps; vertical Centrifugal Pumps, horizontal and vertical plunger pumps.

Centrifugal Pumps—Construction and Operation

The latest developments in "K.L." Centrifugal Pumps, the standard motor driven type being illustrated below, have enabled the incorporation of many special features in both design and construction, these having been brought about by scientific research over a period covering the last few years, the benefits of which are now offered by the "K.L." Pump Department to clients.

All mechanical details have been thoroughly attended to, hydraulic and running balance receiving special care. The casing design is of interest, insomuch that strength, efficiency, compactness and pleasing appearance have been successfully combined. A valuable feature which appeals to the user is the ease with which "K.L." Pumps may be taken apart for inspection and maintenance.

MANUFACTURERS' SPECIFICATION -TYPES L & H

Casing.—The casing, of the volute type covered by Letters Patent for the latest improvements in volute design, is of high-grade cast-iron and is secured to the bedplate by a swivelling trunnion allowing casing to be swivelled to any position to suit pipe connection. The suction cover is strongly ribbed and secured to casing by bolts passing through heavy lugs on casing. The flange connection allows the suction pipe to be rotated to any position independently of the casing. When the suction cover is removed, a clear opening to whole of casing is provided.

Impeller.—The Impeller is of the shrouded, single suction type, provided with balancing chamber to equalise end thrust.

Stuffing Box.—The Stuffing Box is of ample size and fitted with die-cast Brollum gland and packed to suit the nature of the operating conditions.

Bedplate.—The one-piece cast-iron bedplate is of substantial design machined to carry pump housing and motor and provided with drains and screwed connections for piping away leakage from the stuffing box.

Bearings.—A ring-oiler type bearing of ample proportions is fitted, having a large oil capacity. The bearing is of high-pressure, die-cast white metal, which has much greater strength and longer life than babbit metal or bronze. A large hinged inspection lid and plug for cleaning is fitted.

Spindle.—The spindle is of steel, accurately machined. The impeller is secured by means of a key and screwed locknuts.

Thrust.—A double-purpose heavy duty ball thrust bearing is fitted, held in an oil-tight housing.

Flexible Coupling.—A "K.L." disc type flexible coupling accurately bored and keyed to suit motor spindle is fitted.

Materials.—The materials used in the construction of these pumps are the best of their respective kinds, all parts being subjected to rigid inspection and tests before leaving the works. The guarantee of all "K.L." Pumps covers workmanship, materials and duty.

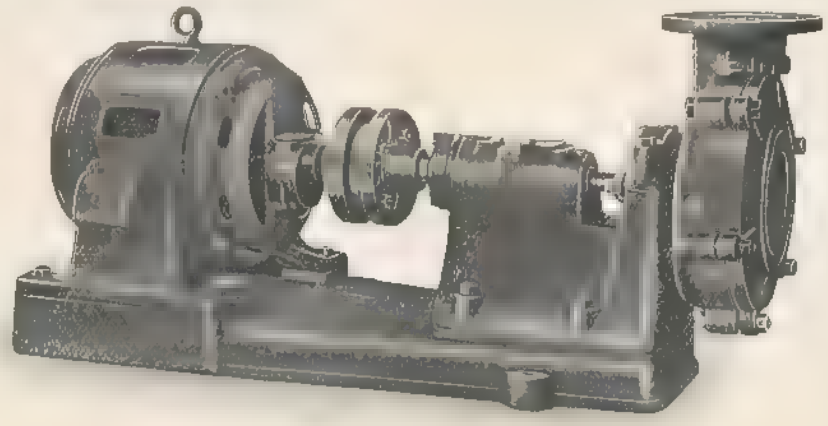
Interchangeability.—All parts are manufactured to fine limits and are carefully inspected and checked before assembly, thus insuring accurate fitting of replacement parts.

Special Materials.—These pumps can be made in special metals to suit special conditions.

Belt-Driven Pumps.—Fast and loose pulleys of ample proportions can be supplied for belt driving.

Course of the Water

Water enters the pump through the suction connection and is guided in a solid stream to the inlet of the impeller. The vanes of the impeller give the water a whirling motion and so, by the centrifugal force produced, the water is thrown out into the volute shaped casing which is designed to reduce the velocity of the water in such a manner as to convert the velocity energy produced by the impeller to pressure energy. The volute then leads the water to the discharge connection.



Standard Motor-Driven Pump, Types L and H.

Facilities for Manufacture

The "K.L." Pump Department comprises drawing and design office, machine shops and a testing department, where pump duties are checked and developmental work carried out.

(Continued on next page)

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

CAPACITY TABLE FOR "K. & L." TYPE "L" CENTRIFUGAL PUMPS.

Pump Size, Inches	Head.		Gallons per Minute.		Approx. Floor Space—Inches	
	Minimum.	Maximum.	Minimum.	Maximum.	Length.	Breadth.
1	[illegible]	40	[illegible]	20	2 ft. 6 in.	12½ in.
1½	15	60	35	45	2 ft. 6 in.	12½ in.
2	15	60	55	95	3 ft. 6 in.	[illegible] in.
2½	15	60	135	145	3 ft. 6 in.	16 in.
3	15	60	165	225	3 ft. 6 in.	16 in.
4	20	100	250	350	3 ft. 7 in.	17 in.

CAPACITY TABLE FOR "K. & L." TYPE "H" CENTRIFUGAL PUMPS.

Pump Size, Inches	Head.		Gallons per Minute.		Approx. Floor Space—Inches.	
	Minimum.	Maximum.	Minimum.	Maximum.	Length.	Breadth
1	20	100	5	20	3 ft. 6 in.	13 in.
1½	20	100	25	45	3 ft. 6 in.	16 in.
2	20	100	35	95	3 ft. 6 in.	16 in.
2½	20	100	135	[illegible]	3 ft. 6 in.	16 in.
3	20	100	165	225	3 ft. 7 in.	17 in.
4	20	100	250	350	4 ft. 3 in.	21 in.

NOTE—Floor space given is for Direct Coupled Motor-Driven Type.

Data Required for Estimates

It is essential, in order that we may furnish the most serviceable equipment, that the following information be furnished when asking for recommendations and prices:—

1. For what purpose the pump is to be used?
2. Quantity of liquid to be pumped per minute?
3. Character of the fluids—salt, fresh, clean or dirty, hot?
4. If solid matter is contained, state size and character of largest pieces.
5. Is the service steady or intermittent?
6. Total head in feet to be pumped against?
7. Suction lift in feet?
8. Pressure on suction, if any?
9. Length and diameter of suction pipe and number of turns?
10. Length and diameter of delivery pipe and number of turns?
11. Character of driving power? If electric, state voltage and kind of current, i.e., whether direct or alternating, and if the latter, what cycle and phase.

Engineering Designing Services

In order to give prompt and reliable service to purchasers of pumping equipment, Geo. W. Kelly & Lewis Pty. Ltd. maintain a staff of competent and experienced engineers at their designing department, and also have representatives in capitals of the principal Australian States and New Zealand.

These representatives are prepared to give efficient service to users of "K.L." Pumps, and to assist prospective purchasers by making recommendations as to proper equipment for individual requirements, and will give information as to standard sizes, capacities, speeds, powers, efficiencies, etc.

Permissible Suction Lift

The following table gives the permissible suction lift of centrifugal pumps when handling water at various temperatures:—

Temperature of Degrees F Water.	Permissible Suction Lift—Feet.	Head required on Suction—Feet.
Below 70	21	
90	19	
110	15	
130	10	
150	5	
170	[illegible]	
190		7
212		12

ARCHITECT'S SPECIFICATION OF SINGLE-STAGE CENTRIFUGAL PUMP INSTALLATION.

PUMP.—Supply and install on concrete foundation by others where indicated on plan ..... Kelly and Lewis type..... ..Direct-Coupled Motor-Driven Pump, having a capacity of..... gals. per min. against a total head of ..... ft. suction and discharge branches ..... diameter. Pump shall be equipped with balanced impeller keyed and held against a shoulder on the spindle by screwed lock-nuts. Bearings to be of ring-oiled type, with white-metal lining, the whole to be mounted on a heavy cast-iron subbase and direct-coupled to motor by a flexible coupling.

MOTOR.—Motor to be of approved manufacture ..... horse-power ..... volts ..... current, operating at a speed of ..... rev. per min., capable of running without undue heating, sparking or sign of overload.

(Continued on next page)

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

Centrifugal Pumps—Uses and Power Application

General water service, hot water supply, boiler feed service, heating systems, air washing, fire protection, refrigeration, sump pumping, sewerage "K.L." Pumps can be adapted for direct coupling to electric motors, steam, gas or internal combustion engines, or can be arranged for belt driving to same.

Types L & H Centrifugal Single-Stage Pumps

These pumps are designed for hard service with a minimum of attention, being of a rugged design, and combining efficiency with neat appearance. Special features are: (1) Large bearings, having large oil reservoirs; (2) Swivelling casing to allow connection to suction and discharge piping in any position.

Multi-Stage Pumps

Where the head to be pumped against is greater than Single Stage, Type H, can handle, a multi-stage pump should be used.

These pumps are designed so that they can be built up by increasing the number of stages to pump against high heads. They can be arranged for either belt driven or for direct coupling to any type of power unit.

Vertical Centrifugal Pumps

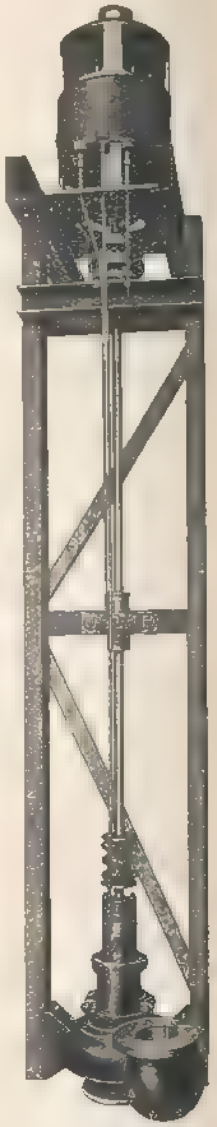
This type of pump, as illustrated on this page, is used for pumping from a deep sump or well where the suction lift would be too great if the pump and motor were mounted together at the surface level. Also, if the pump is working intermittently, as may be the case of draining a sump, the pump is always primed, i.e., full of water, and so obviates the necessity for having a foot-valve on the suction pipe or any automatic priming device which would otherwise be required.

A float-operated switch can be used with this type of pump to start and stop the motor automatically when the liquid reaches certain definite predetermined levels.

Other Types of Pumps

The "K.L." three-throw single-acting hydraulic pump is manufactured for supplying liquids at high pressure and is especially suited to handling viscous liquids such as heavy oils, molasses, etc., and for supplying hydraulic power for lifts, presses, etc.

The "K.L." split casing type of pump, in which the casing is split and flanged along the axis of the pump, has the advantage that when space around the pump is limited, by lifting the cover the whole of the spindle assembly, including impellers, glands, and neck-bushes, are exposed for attention.



Vertical Centrifugal Pump with Steel Frame.

LIST OF REPRESENTATIVE INSTALLATIONS

MELBOURNE:	SYDNEY:
New A.M.P. Building, Collins Street.	N.S.W. Government Savings Bank
Hotel Alexander.	Farmers' Ltd.
Howey Court.	Hotel Australia.
G. J. Coles & Co.	B.M.A. Building
Taxation Offices.	Stanton House.
Arts Block, University of Melbourne.	Morris Hotel.
Melbourne Public Library.	David Jones Ltd.
Queen Victoria Hospital.	Lewisham Hospital.
Austin Hospital.	Colonial Mutual.

Multi-Stage High Lift Centrifugal Pump.

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

SECTION O

[Containing S.A.A. Filing Section No. 29e]

FIRE PROTECTION

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

29e

S.A.A. File No.

WORMALD BROS. LIMITED

FIRE PROTECTION ENGINEERS
SINCE 1889

CITY OFFICE: 19 BLIGH ST., SYDNEY. FACTORY: YOUNG ST., WATERLOO, SYDNEY

BRANCHES:

MELBOURNE—180 Bay St., Port Melbourne. BRISBANE—"City Buildings," Edwards St.
NEW ZEALAND—"T. & G." Buildings, Wellington. ADELAIDE—Bowden.
PERTH—Wellington St.

[For Other Products, See Index]

The Grinnell Automatic Sprinkler System

Grinnell Soldered Sprinkler Head.

Grinnell Automatic Sprinklers can be installed in any building—there is no limit to their adaptability. The Grinnell System is the oldest, most widely used and most successful Fire Protection system known. It consists of a series of self-operating valves, known as "Sprinkler Heads," connected at regular intervals throughout the ceilings and roof of the building to water pipes, fed through control valves by the street main or some other specially approved supply.

Grinnell Sprinklers will not destroy the artistic design of a ceiling—the pipes can be concealed so that only the small "head" need project. Two alarms operate automatically with the opening of a "head," so that, while water is being poured on to the fire, the Brigade is summoned and a bell ringing on the building face warns of the danger. Only the sprinkler nearest the fire opens—not the whole number on the one floor, as sometimes thought—so that water damage is negligible.

Your clients will have their insurance premiums greatly reduced by installing "Grinnell" protection (see details below). Plans showing proposed position of sprinkler heads will be submitted and full co-operation with you is assured in every way.

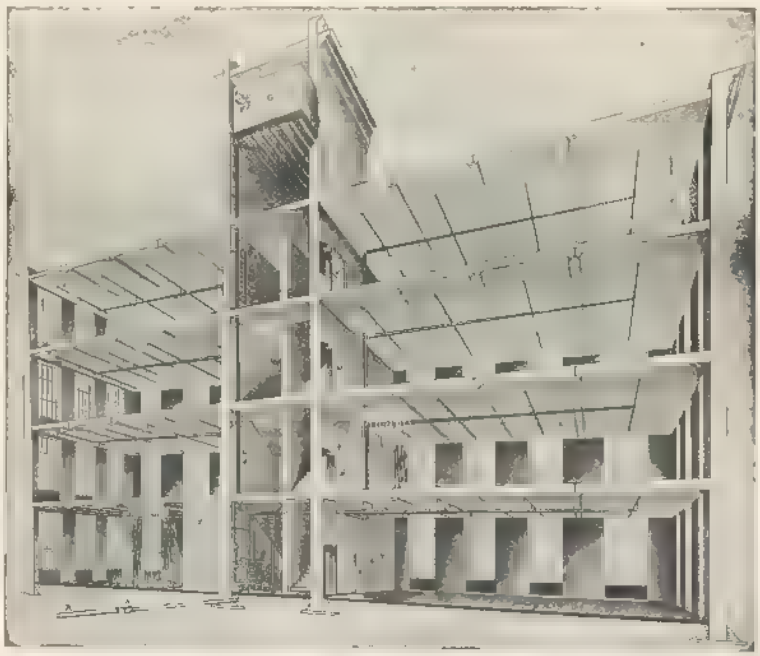
Grinnell Quartzoid Sprinkler Head

CONNECTIONS, PIPING AND WATER SUPPLY

Automatic Sprinkler systems, to obtain the full insurance rebates, and known as "double supply installations" must be fed by two water supplies of independent sources. Two street mains are not permissible, unless they are from different reservoirs. The usual combination of supplies is, one street supply and a tank of not less than 7,500 gallons. This tank is usually elevated above the premises, either on a steel structure or built on one corner with the building. Its position is unimportant, except for economy however, but it must be at least 15 feet above the highest sprinkler head.

If an elevated tank is not possible, a "pressure tank" can be substituted. This may be stored at ground level, but must have an automatic pump fitted, capable of pumping at least 6 lbs. running pressure on the highest sprinkler.

The tank supply is only an emergency supply in case of a fall in pressure or failure of the street supply and so may be omitted. In this case, when the street supply only is connected, the installation is known as a "single supply," and is only subject to approximately half the insurance reduction.



Showing Street Main and Tank Main Combining at Central Valves, with Sprinkler Pipes Radiating from them.

OPERATION OF THE SYSTEM

By pumping up pressure in the pipes, with the hand-pump fitted, to a point higher than the pressure of the street main the "alarm" valve is automatically closed—the installation is then ready for action. As soon as the heat of a fire strikes the nearest sprinkler head, the link (held with special fusible solder) melts and springs out. This leaves the head perfectly free for the water to flow through and by so doing removes the pressure from the alarm valve. The street water then flows through and causes the two alarm turbines to operate.

INSURANCE REBATES

The rebates from Fire and Loss of Profits premium on building and contents vary slightly in Australia and New Zealand. For ordinary circumstances however, they are:

Double Supply 47½ per cent. Australia 45 per cent. New Zealand.

Single Supply: 30 per cent. Australia and New Zealand.

In most cases, the Industrial Bonus of 10 per cent. is also allowed.

(Continued on next page)

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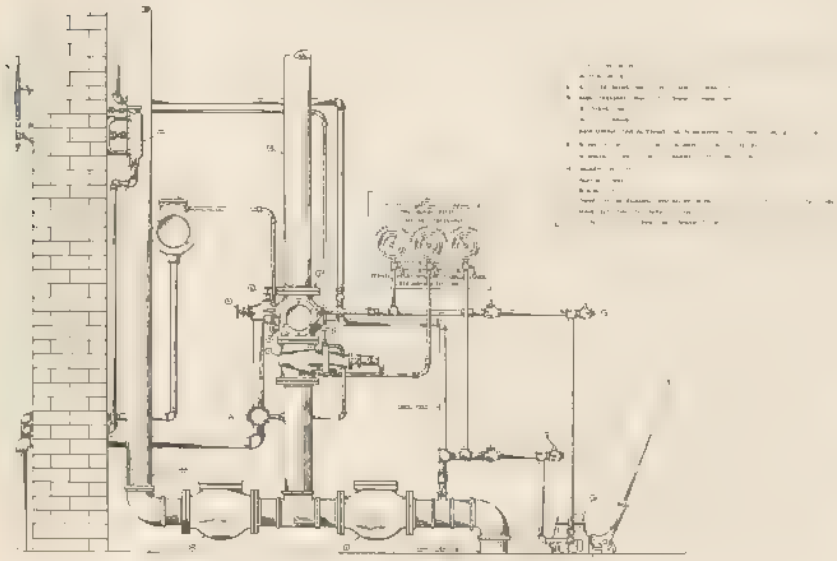
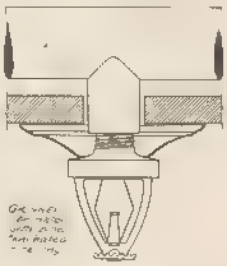
STANDARD SET OF VALVES FOR GRINNELL SPRINKLER INSTALLATION



Installation

All pipes are cut and screwed to exact sizes in the factory The complete installation is sent on to the job ready for assembling. Hangers are available for any class of ceiling and special ceiling plates are employed when pipes are concealed, so that a neat appearance is guaranteed. For dropping through floors or running through beams in concrete, galvanized sleeves, as shown, are set in place before pouring

SPRINKLER IN CEILING



The Grinnell Soldered Sprinkler Head

The "Grinnell" Soldered Head is for use in any circumstances, except where there are corrosive fumes detrimental to lead and zinc solder. It is extremely simple in construction and therefore the most reliable sprinkler manufactured. The water is held back by a glass valve, which seats on a flexible diaphragm. This flexibility takes up variations in pressure and so prevents leakage. The glass valve is held in position by a strut composed of two movable parts which are held with special solder. The fusing point is normally 155 deg. Fahr, but for special risks, high temperature heads are made up to 360 deg Fahr.

The Grinnell Quartzoid Sprinkler Head

The "Quartzoid" Head varies only in the strut. A glass bulb full of a special chemical holds the glass valve in place. The heat of a fire expands the liquid, breaks the glass and releases the valve. These heads are not affected by acid fumes.

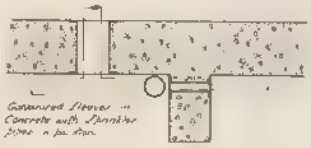
The Direct Brigade Alarm Turbine.

Direct Brigade Alarm

This Direct Brigade Alarm is a feature which gives protection against unnecessary water damage. It operates automatically with the "Grinnell" system and transmits an electrical alarm to the nearest fire station. By so doing, the brigade is called instantly, and on arrival they turn the water off immediately. The alarm is operated by water—on passing through the alarm valve—playing on to a turbine. This revolves, and in doing so breaks the contact of an electrical circuit and registers on a special indicator board at the fire station

Fixing in Concrete

For fixing pipes to concrete ceilings, special drills are used, and "Tampin" or other approved expansion plugs are inserted and ordinary clips screwed to them.



Pipes can be concealed in concrete, but special arrangements must be made. We are always ready to discuss this with you in detail.

Tests

Installations should be tested each week. We have a specially trained staff for doing this at a mere service cost. A special test valve facilitates this work, and is always fitted at the main control valves

Typical Installations

Grace Bros. Ltd., Sydney
Anthony Hordern & Sons Ltd., Sydney.
British-Australasian Tobacco Co. Ltd., Sydney.
Myer's Ltd, Melbourne.
Yarra Falls Spinning and Weaving Mills, Victoria.
Over 1,000 buildings in Australia.

Grinnell Drenchers

Grinnell Drenchers are "Open" Sprinkler Heads placed over windows on the outside of a building to protect it from fire in an opposing building. They are controlled by a hand valve, generally placed in an accessible position on the ground floor and, when turned on, they form an absolute curtain of water down the exposed face All pipes used in Drencher Systems are galvanized to withstand corrosion. Fully detailed plans will be supplied when quoting for an installation

(Continued on next page)

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"SIMPLEX" CHEMICAL FIRE EXTINGUISHERS

Types of Extinguishers

Some fires call for the use of different chemicals and so we manufacture various types of extinguishers to give protection in all circumstances. Every machine is guaranteed to pass the requirements of the Fire Underwriters' Association and has been approved and accepted by the Commonwealth and State Governments

Selection of Correct Type

The most suitable type is determined by the class of fire risk. If required for ordinary hazards other than those mentioned specifically below, the "Simplex" is recommended. For any inflammable liquid or product which will float and burn on the surface of water, the "Pyrofoam." For any electrical risk — switchboards, power house, etc., the "Phister" or "Simplex Auto"

The actual number required is governed -for insurance reduction purposes—on the rule of one machine for every 250 sq. yards of floor space, with a minimum number of two per floor. In special cases, however let us advise you.

Reversible. Plunger Type.

"SIMPLEX"

The "Simplex" is known as a "Soda and Acid" Fire Extinguisher and is used for all ordinary risks. It is of two gallons capacity—light enough for a lady to handle—easy to operate—instantly effective. There are two types of "Simplex," though both are for the same class of risk

(1) The Reversible is operated by simply turning it upside down and spraying the liquid on to the fire

(2) The Plunger type is operated by striking the plunger on top and so breaking glass bottle inside.

"SIMPLEX" FOAM TYPE

"Pyrofoam" (Trade Mark) See top right illustration

Pyrofoam Liquid floats on the top of any burning liquid without mixing and so eventually spreads over the whole surface till it smothers the flames. The two-gallon machine shown here generates eight gallons of "Foam," and so is capable of extinguishing quite a serious fire It is operated by turning it upside down in a similar way to the "Simplex," and must be recharged every twelve months. "Pyrofoam" is the correct type of machine to have at any spray-painting booth, and is guaranteed to pass all requirements of the Insurance Companies in this regard.

Diptank Models

In addition to the chemical engines described below, a special model is made for diptank risks. This is automatic in action, and is the only "Foam" Extinguisher of this type which is officially approved in Australia. It is of 16 gallons capacity, though it generates 128 gallons of "Foam." This machine is of special benefit for paint and varnish manufacturers for protecting their vats of inflammable products. It is suspended over them from the ceiling or on a framework over the vats. A fusible link holds the container in position, so that the heat of a fire releases it and automatically pours the "foam" over the entire surface of the vat.

2 Gall. Hand "Pyrofoam

"AUTO" TYPE

This extinguisher, and another known as the "Phister," come under the heading of C.T.C. (Carbon Tetrachloride) machines. C.T.C. is a liquid guaranteed to be a non-conductor of electricity up to 40,000 volts, and so is particularly suitable for all electrical fires. The "Simplex" Auto Type is primarily designed, however, for use on Motor Cars, Launches, or any petrol engine fire, for on striking the heat of the flames the liquid turns into an oxygen-destroying gas, and so smothers the fire.

They are also called for by Civic Authorities in the bio-rooms of picture theatres. C.T.C. does not deteriorate, and so these machines never have to be refilled unless used. The "Simplex" Auto should always be installed near switchboards or wherever electrical fires might occur, but for large power house use, we suggest the "Phister" mentioned above. This is a one-gallon C.T.C. machine with a pumped up air pressure which gives a continuous stream, and so perfect safety on high voltages

1 Quart "Auto Type"

Chemical Fire Engines

Chemical Engines are made in both "Simplex" and "Pyrofoam" types and are used for large factories where isolated buildings need protection, and also for timber yards and similar risks where a large quantity of liquid is needed. They are made in 10-gallon and 35-gallon models, mounted on wheels, with approximately 40 feet of hose, so that a considerable range is given.

Maintenance Service

All extinguishers, other than C.T.C. types, should be inspected every twelve months, The "Simplex" Plunger type need only be recharged every three years, but the others should be done every twelve months. We have a trained staff to carry out this work at a nominal service fee, and by having us do it all anxiety is removed from the owners.

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SECTION P

[Containing S.A.A. Filing Section No. 29f]

GAS *and* GAS APPLIANCES

MODERN METHODS OF COOKING AND HEATING WITH GAS

The universal use of gas for cooking and for practically every kind of heating furnishes striking evidence of the general utility and excellent efficiency of this clean, dependable fuel. It is the purpose of this section to deal with the leading uses for gas, and to describe briefly some of its principal advantages for cooking, water heating, room warming, refrigeration and incineration, also to supply a brief outline of the uses for gas in the industrial and commercial fields.

The use of gas for both domestic and industrial purposes is the subject of constant investigation and research, so as to secure the modernisation of existing appliances and to promote the highest standards of efficiency in new appliances.

Architects and builders, and also those interested in home building, are invited to avail themselves of the up-to-date facilities provided by The Australian Gas Light Co. for supplying information, advice and assistance in connection with the use of gas and the selection of modern labour-saving gas appliances.

Because of space limitations, descriptions are necessarily brief, and illustrations are limited in number, but more detailed information relative to any phase of gas cooking or gas heating will be gladly supplied on request.

RAMSAY

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29f

S.A.A File No.

THE AUSTRALIAN GAS LIGHT CO.

PITT, BARLOW AND PARKER STREETS, NEWMARKET, SYDNEY.
Phones: M 6503 (24 lines)

GAS FOR COOKING, WATER HEATING, ROOM AND SPACE HEATING, REFRIGERATION, INCINERATION, CLOTHES DRYING.
GAS FOR INDUSTRIAL HEATING, STEAM RAISING.
BY-PRODUCTS:—COKE, DURATAR, DURATAR EMULSION, DURAVIA, DURATENAX, PITCH, TAR OILS, BENZOL, TOLUOL, SOLVENT NAPHTHA, PYRIDINE, SULPHATE OF AMMONIA

GAS APPLIANCES

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SECTION 1

COOKING WITH GAS

Possessing, as it does, the major advantages of reliability, simplicity of operation, and low heating cost, the modern gas stove establishes strong claims for selection in every kitchen. Its advantages are clear cut and decisive, and they are expressed in terms of improved kitchen comfort, greater cooking convenience and permanent cooking economies.

MODERN IN EVERY DETAIL

In conception, design and construction, as in minor details, modern gas stoves reflect the most progressive ideas in cooking equipment. They conform to modern trends, satisfy new demands, and guarantee a standard of cookery service that is not equalled by any other appliance.

MODELS FOR EVERY KITCHEN

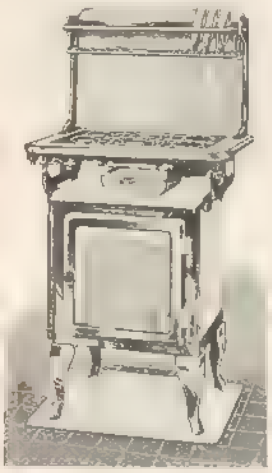
Modern gas stoves are made in so many different sizes and in such a wide variety of styles and finishes that even the most exacting demands in regard to appearance, style and service are faithfully met. The extended elevated type is particularly suitable for large kitchens—its general style conforming to up-to-date methods of kitchen layout. The cabinet, or ordinary type, which is made in a very large number of sizes and styles, is ideally suited for small kitchens, or kitchens in which the amount of floor space is limited.

BEAUTIFUL FINISHES

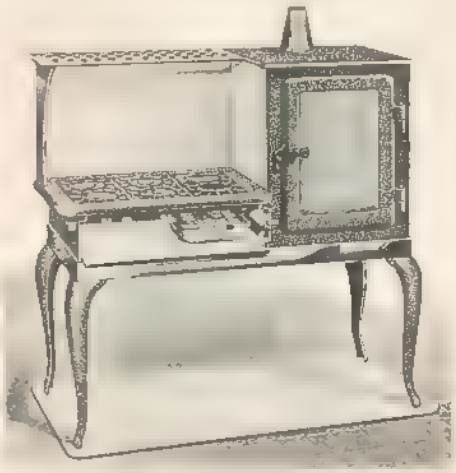
The deft use of white, coloured and mottled porcelain enamel, glistening nickel and non-tarnishing chromium has given new beauty and fresh charm to gas stoves. It has widened the scope of kitchen beautification, introduced a pleasing atmosphere of brightness into the kitchen, and dispensed with frequent cleaning and polishing. Mottled enamel—a recent development in porcelain finishes—is practically indestructible, being heat proof and crack proof, whilst chromium—the new plutish plating with the lustrous surface—does not tarnish, and seldom needs rubbing.

MANY IMPROVEMENTS

Recent years have witnessed many noteworthy improvements to gas stoves, the most prominent being—Efficiency burners, re-designed hot plates, heat retaining ovens, oven temperature regulators, pilot lighters, drip-catching crown plates, elevated ovens, new styles, new finishes, new colourings and new models.



A popular cabinet model, finished in porcelain enamel and chromium plating.



Elevated Type—finished in new mottled enamel and chromium plating.

Modern Gas Cooker—finished in new mottled enamel.

(This indestructible enamel is obtainable in many different two-colour effects).

TYPICAL EXAMPLES OF MODERN GAS STOVES

(Continued on next page)

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Gas Cooking in Relation to Home Planning

Before planning a kitchen it is advisable to finalise details regarding the stove—location, size, style, appearance. This not only prevents disappointment, but makes it possible to secure the most pleasing results at relatively small cost. Architectural style of room, furnishing arrangements and colour scheme—all these have a bearing upon the style and finish of the stove which should be used.

In installing a gas stove, care should be taken not to place it in a draught or in a position where it is either given too little working space or is isolated from the other kitchen appurtenances.

FACTORS FAVORING GAS COOKING

RELIABILITY.—No other form of heat responds to human demands with such unfailing certainty.

CONVENIENCE.—A gas stove does not involve any preliminary or afterwork. It can be used at a moment's notice, as often as it may be needed, and for as long as it may be required.

CONTROLLABILITY.—Gas is the only fuel which gives absolute control over heating temperatures, and possesses a wide degree of flexibility.

SIMPLICITY.—No other stove provides such a simple, straight-forward method of cooking, or gives such accurate results without constant attention or frequent manipulation.

ECONOMY.—Gas cooking is cheaper than other methods.

EFFICIENCY.—A gas stove does all kinds of cooking perfectly with equal facility and does not necessitate the use of supplementary equipment.

COMPARATIVE COST OF GAS AND ELECTRIC COOKING.—In the appended table the cost of cooking a wide variety of foodstuffs with both gas and electricity, is set out. A careful study of the figures contained therein will furnish many interesting examples of the economy of gas.

Quantity of Heat in Therms Required for Family Consisting of Man, Wife and Two Children, on Basis of 51 Weeks per Annum.

GAS

Town.	Brisbane	Sydney	Melbourne	Adelaide	Perth	Hobart
Degree Days.	516	1429	2554	1648	1296	3889
Cooking	80.12	80.12	80.95	80.12	80.12	81.72
Laundry	[illegible]	25.25	26.0	25.25	25.25	26.75
Baths	[illegible]	39.85	15.83	39.85	37.86	47.82
Fires	[illegible]	11.3	25.5	16.[illegible]	13.0	38.9
Total	130.2[illegible]	153.52	178.28	161.72	156.23	195.19
Equivalent to volume in cub. ft. of gas of respective calorific value	[illegible]	29.000	32.710	29.400	32.900	35.740
Cost of Gas in pence per Therm	17.1	[illegible]	15.6	20.3	20.0	32.1
Total cost	£9/5/7	£8/6/2	£11/11/0	£13/13/7	£13/0/5	£17/19/6
Actual average Therms used per consumer for all purposes	127.5	148.5	126.5	106.9	91.91	75.82

Remarks: 15% has been added to the gas consumed in the cooking tests to cover wastage and variations in modus operandi of various persons using gas.

ELECTRICITY

Town.	Brisbane	Sydney	Melbourne	Adelaide	Perth	Hobart
Degree Days.	516	1429	2554	1648	1296	3889
Cooking	42.61	42.61	43.1	42.61	42.61	43.5
Laundry	13.[illegible]	13.3	13.7	13.3	13.3	14.1
Baths	11.7	29.4	33.8	29.[illegible]	27.93	35.28
Fires	7.6	1[illegible].0	17.9	11.5	9.1	27.2
Total	[illegible]	95.31	108.5	96.81	92.94	120.08
Equivalent to Electric Units	2170	2796	3178	2831	2721	3514
Minimum cost of current in pence per unit to domestic consumer	1.70	1.25	1.15	2.2	1.25	1.75
Total cost	£16/7/6	£14/10/7	£16/11/–	£26/11/4	£14/3/5	£25/13/6
Actual average units used per consumer for all purposes	436	1847	939	793	1218	1306

NOTE.—A "Degree Day" is the product of the number of days in each month of the heating season multiplied by the difference between the average temperature for each month and 65 degrees (F.)

Table Showing Gas Flow through Nipple Orifices

GAS AT ORDINARY PRESSURE, VIZ., 3 in. WATER COLUMN PRESSURE

Diameter of orifices (inches)	5/64	3/32	7/64	⅛	9/64	5/32	11/64	3/16	13/64	7/32	15/64	¼
Approximate flow per hour (cub. ft.) by experiment	18	25.8	32.4	43	54	64	80.5	96	11[illegible].4	126	138	163

(Continued on next page)

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SECTION 2

WATER HEATING WITH GAS

Despite the variety of present-day needs in regard to hot water requirements, gas provides a service which satisfies practically every modern demand and possesses a definite superiority over other methods of heating. Gas-operated water heaters vary in size from a small sink heater—with a capacity of less than a gallon—to a large storage system which supplies hundreds of gallons of really hot water every 24 hours.

These appliances, which are of modern design and construction, are simple, clean and convenient, seldom require mechanical attention and guarantee an instant and regular supply of steaming hot water at all times.

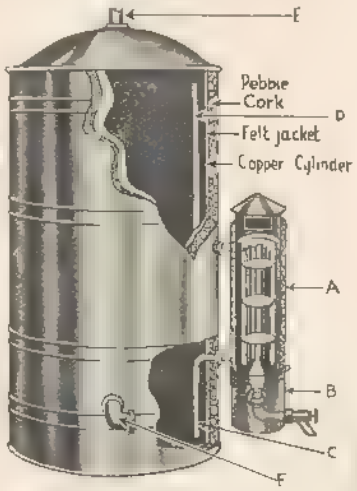
Brief descriptions, and also interesting data in connection with the principal types of gas-operated water heaters, are contained in the following pages.

GAS OPERATED STORAGE WATER HEATERS

Gas-operated storage water heaters furnish an excellent example of simplified water heating and of the economy with which a complete hot water service can be regularly maintained. These heaters are of two types, viz., continuous and semi-continuous, the use of the one or the other being dependent upon the nature of the hot water demand.

Continuous Type

This heater—of which the Wee Jet is a typical example—consists of (a) a small heating chamber and (d) a storage boiler. The water is heated in (a) by a small burner (b) consuming from 2 cubic feet of gas per hour upwards according to the capacity of the system and flows into the storage boiler (d) at a relatively high speed, producing a thermal circuit and facilitating the heating of the bulk of the water in the boiler. When hot water is drawn off (from e), cold water is admitted into the bottom of the storage boiler (from f), when it passes into the small heating chamber. A special advantage of this heater is that the gas can be raised or lowered to suit variations in the cold water temperature, or to supply water at a higher temperature. The storage tank is heavily insulated with a felt jacket and pebble cork to prevent heat losses and it has no floats, valves or mechanism to get out of order or require attention. No flue is needed and, as the heater is compactly built, it can be readily installed in the kitchen or laundry.



A Diagrammatic Sketch of the "Wee-Jet" Storage Gas Water Heater.

Other gas-operated storage heaters, such as the "Sunrise," "One Jet" and "Super Heater" embody the same principles of heating as the "Wee Jet" and provide a service equally as satisfactory.

25 PER CENT DISCOUNT OFF GAS USED BY STORAGE WATER HEATERS

The attention of architects and builders is drawn to the discount of 25 per cent. which The Australian Gas Light Company allows off gas used by continuous and semi-continuous storage heaters.

This discount is granted only in connection with storage installations equipped with a separate gas meter and otherwise in keeping with the Company's requirements.

Semi-Continuous Type

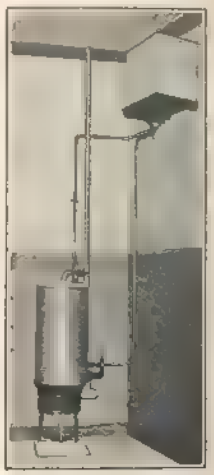
In this type the heating is carried out intermittently according to the demands made upon the hot water service. An excellent example of this system is provided by the "Briar." This heater differs in principle from the "continuous" type in that the water in the storage tank is heated by a large burner, thermostatically controlled, i.e., the gas is turned on and off as required, and maintains the water in the heater at a constant, pre-determined temperature. When hot water is drawn off, cold water is admitted and the gas is turned on to heat the cooled water; but when the water is again heated to the original point, the gas is shut down until only a pilot jet remains burning.

The special merits of heaters of this type are that they possess maximum flexibility with reasonable supply of hot water. They are specially adapted for hospital wards, tea rooms and such other places where the demands are of a fluctuating nature and very hot water is required.

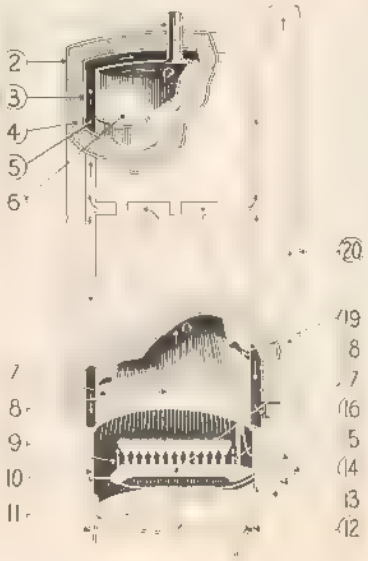
Quick Recovery

Semi-continuous heaters are noted for their quick recovery, or, in other words, the speed with which they heat the contents of the storage tank after the tank has been emptied. The time required varies according to the make of heater, but it averages approximately 1½ hours.

Other semi-continuous heaters, such as the "Hot Flow" and "Reserve," operate on similar principle, and provide a most satisfactory hot-water service.



An installation of a semi-continuous, gas-operated Storage Heater.



AN X-RAY DIAGRAM OF THE "BRIAR" SEMI-CONTINUOUS STORAGE HEATER

1—Hot Water outlet pipe.
2—Outer case of insulation jacket.
3—Inner casing of insulation jacket.
4—Cork insulation tightly rammed.
5—Heating space round water tank.
6—Upper storage tank.
7—Lower storage and heating tank.
8—Heating chamber.
9—Pilot jet.
10—Burner box casing nickelled.
11—Nickelled legs.
12—Cold water inlet.
13—Thermostat controlling gas supply.
14—Pilot regulating screw.
15—Thermostat adjusting screw.
16—Pilot supply tube.
17—Pilot jet.
18—Burner casting.
19—Thermostat element tube.
20—Flue lead-up pipe.

(Continued on next page)

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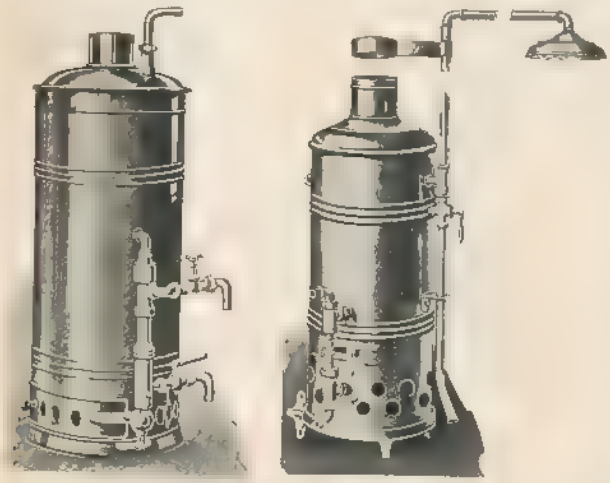
Service or Multi-Point Heater

The Service or Multi-Point Heater is sometimes described as "practically an extension of the water main in the form or a spiral copper coil with a powerful gas burner at its base." This heater operates on the automatic principle being fitted with an automatic valve which controls the gas supply when the water tap is open or closed It is connected direct to the water main and its successful operation depends to a very great extent upon the pressure exerted by the flow of water in the main Because of the influence of water pressure upon the operation of this heater, it is not desirable to install it in high buildings unless means are provided to ensure a suitable water pressure being maintained

Instantaneous Hot Water.—This heater gives a continuous flow of 2½ to 4 gallons of hot water per minute and will supply at that rate for as long as hot water may be required. When hot water is not being drawn off, the burner cuts down to a mere trickle of flame, so that the cost of the system is directly proportionate to the quantity of hot water used.

Information regarding the gas consumption, outflow, etc., of well-known Service or Multi-Point Heaters, as supplied by the manufacturer, is given on page 316, and below is an example of a typical model.



Service or "Multi-Point" Heater — Modern Gas Bath Heater.

Typical Models.

Gas Bath Heaters

The gas bath heater is almost universally recognised as one of the simplest and most convenient appliances for providing an instantaneous supply of hot water in the bathroom. It is extremely economical and supplies steaming hot water any hour of the day or night, at the turn of the tap. Two main types are used, viz., contact and non-contact, but the latter is considered the more desirable because the heat from the gas flame does not come into direct contact with the water

Installation work is comparatively simple and also inexpensive, and even a bathroom of small dimensions does not present any difficulty in regard to the fitting up or operation of one of these heaters.

A combination gas and water tap ensures the maximum degree of safety when operating the heater, and the use of non-tarnishing chromium has materially improved its appearance and rendered polishing almost unnecessary.

Gas bath heaters are made in a big range of sizes and the majority of them can be obtained with or without a shower attachment. A popular model, the capacity of which varies from 1¾ to 1⅞ gallons per minute, is illustrated on this page.

A Gas Sink Heater Instantaneous Type.

Gas Sink Heaters

This small heater is invaluable for supplying hot water for the sink and for all other kitchen requirements. It is either automatic or direct controlled, does not require a flue and can be readily connected to both the gas and water services. Two types are available, viz., storage and instantaneous, the latter being similar in all respects to the ordinary gas bath heater, except that it is very much smaller

Sink heaters are also an economical medium for supplying hot water in dentists' and doctors' surgeries and hairdressing saloons, and for almost every other purpose where hot water is required frequently in small quantities.

In the accompanying illustration one of these handy little heaters is shown fitted in its usual position over the sink

Cafe and Restaurant Boilers

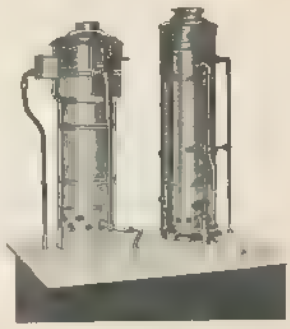
These heaters are specially designed to suit the requirements of Cafes, Restaurants and Tea Rooms. They are extremely rapid in action and are particularly suitable for conditions where the demand for boiling water fluctuates widely, being designed for dealing with "rush" periods and "slack" periods alike, with very low gas consumption

The construction of these heaters is extremely simple, and when hot water is not being drawn off, only an absolute minimum of gas is used—just sufficient to keep the water a little below boiling point.

The cold water supply is automatically controlled by a ball valve, and there is no intricate mechanism to get out of order.

A further development of this type of water heater is the combination hot water boiler, pie urn and hot milk or coffee urn. In this "quick service" appliance the burner under the boiler supplies all the heat required by the boiler, milk urn and pie urn

Heaters of this type do not require a flue and they can be fitted on counters, benches or stands without cutting away or altering counter tops, etc.



Two Modern Cafe or Restaurant Boilers.

(Continued on next page)

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GENERAL INFORMATION AND USEFUL DATA

Effect of Water Temperature on Water Consumption

An important feature in connection with the hot water supplies in public buildings, is the effect of water temperature on water consumption. When the water is delivered at a temperature which does not necessitate the addition of cold water, a large amount of water is actually wasted. On the other hand, water delivered at a much higher temperature than that actually required, calls for the addition of cold water. The economical advantages of the latter will be readily appreciated. In this connection it is interesting to observe that gas-operated storage heaters invariably supply water at a temperature far in excess of that suited for personal use

HOT WATER FOR HOSPITALS

(Results given by Briar Heaters)

Maternity Hospital:—A Three-storey Building containing 60 Beds.

The hot water for distribution throughout the building is supplied from two fifty-gallon Briar Heaters. These are thermostatically controlled, and operate continuously day and night, the points supplied with hot water being:—

5 Showers; 5 Baths; 12 Basins; 3 Sinks; 2 Sterilizers.

In addition to the Briar Heaters, there are four large sterilizers, three small sterilizers and six rings, all independently heated by gas.

During a twelve months' period the gas used for all the above purposes averaged 3,462 cubic feet per day, equivalent to 144 cubic feet per hour. Of this amount, approximately 1,367 cubic feet is used by the Briar Heaters.

The demands for hot water in this hospital are particularly heavy.

Hot Water Demand Should be Carefully Analysed

The hot water demand, not only in terms minimum and maximum quantities per 24 hours, but also in relation to individual uses throughout the 24 hour cycle, should be carefully computed and analysed. If this is not done there is always a danger of installing an appliance which is totally inadequate for the purpose, or, on the other hand, far too large and consequently a good deal more costly than the circumstances warrant. An analysis of the hot water demand has the further advantage of indicating the type of appliance most suitable for the job.

Conversion Installations

The conversion to gas of coke or oil, etc., fired water heating systems, whilst it is practicable in some instances, is generally inferior to a complete change over to gas—especially from the point of view of cleanliness, convenience and ultimate cost. The company will be pleased to report and advise upon all matters of this kind.

Classification of Gas-Operated Water Heaters

Type.	Supply	Operation.
Central Systems.		
Storage Heaters Continuous	Complete hot water service	Automatic
Do. Semi-continuous	Complete hot water service	Automatic
Instantaneous		
Service and Multi-Point Heater	Complete hot water service	Automatic
Bath Heater	Bath and Shower	Manual control
Sink Heater	Kitchen Sink	Automatic and manual control
Cafe and Restaurant Boiler	Hot water for Cafes, Restaurants, etc.	Automatic

Gas Consumption Formula

In order to determine the number of cubic feet of gas necessary to raise a known quantity of water through a known number of degrees, use the following formula:—

$$C.\ Ft. = \frac{G \times 10 \times D}{B}$$

Where, C. ft. = Cubic foot of Gas.
G = Gallons to be heated
10 = Because 1 gallon weighs 10 lbs.
D. = Degrees raised or final temperature, minus initial temperature.
B = B.Th.U. Value of Gas.

EXAMPLE:

30 gallons are required to be heated, say, from 60 degrees to 100 degrees F. (or through 40 degrees F.) with gas of 500 B.Th.U., then

$$\frac{30 \times 10 \times 40}{500} = 24 \text{ cubic feet.}$$

This is the theoretical value and, since heat is lost in waste gases, radiation and absorption by metal parts, the efficiency of the water heater must be known, it is usually between 80 per cent. and 89 per cent.—say it is 85 per cent. Then the actual consumption would be

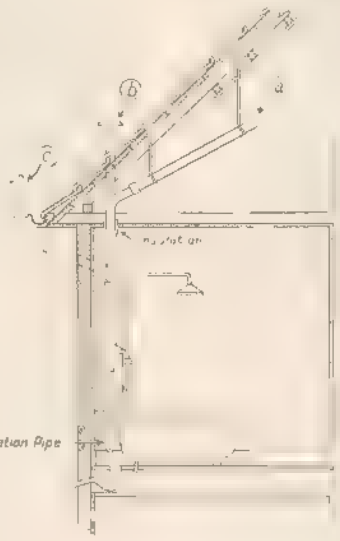
$$\text{actual cubic feet} \frac{24 \times 100}{85} = 28.24 \text{ c. ft.}$$

Estimating Capacity of System Required

In estimating the number of gallons capacity of a Hot Water Storage System required for any particular job, the following basis may be used as a guide, taking water at a temperature of 160 degrees:—

Bath—15 gallons.
Shower—5 gallons.
Hand Basins—2½ gallons per person residing in the house.
Kitchen Sink—1 gallon per person residing in the house.

FOR EXAMPLE.—
For three persons, 28 gallons (say 30) would be required.
For five persons, 36 gallons (say 40) would be required.



Alternative Methods for Installing Flue Pipe to Bath Heater.

(a) Terminated in Roof Space.

(b) Carried through roof—to end in suitable terminal.

(c) Carried through wall—to end in suitable terminal

Useful Data

One British Thermal Unit represents the heat required to raise 1 lb. of water 1° (F.)

One gallon of water weighs 10 lbs.

3,412 B.Th.Units = 1 Board of Trade unit, which equals

1 KW or 1 000 Watts } for one hour, i.e., "Kilowatt hour."

1 Board of Trade Unit, or 1 KW, or 3,412 B.Th. Units=1 Electrical Unit.

500 B.Th. Units (net) are contained in 1 cub. ft. of gas as supplied by the A.G.L. Co.

Formula for Hot Water Supply

Lbs. weight of water x degrees rise in temp. (F.)=B.Th. Units required—

For Gas Estimations—

$$\frac{\text{B.Th. Units reqd.}}{500} = \text{Cubic feet of gas required.}$$

For Electrical Estimations—

$$\frac{\text{B.Th. Units reqd.}}{3412} = \text{Electrical Units required.}$$

Ex. 1 gal. from freezing (32°F.) to boiling (212° F.)=

10 x 180=1,800 B.Th. Units, or

$$\frac{1800}{3412} = 0.53 \text{ Electrical Units.}$$

$$\frac{1800}{500} = 3\ 3/5 \text{ cubic feet of gas.}$$

The minimum price of electricity for domestic purposes is 1½d. per unit.

The price of Gas in Sydney is 5/9 per 1,000 cubic feet, or 14½ cubic feet for one penny

(Continued on next page)

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SECTION 3

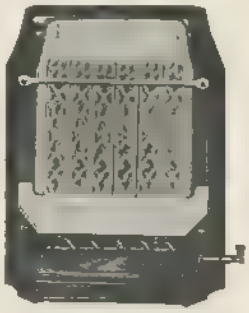
ROOM HEATING WITH GAS

The Modern Gas Fire

With its radiant sunlike warmth and regular ventilating action, the modern gas fire provides a system of room warming which is infinitely more healthful and hygienic than that of other heating appliances. This cosy fire carries the endorsement and recommendation of leading medical experts, and is used by thousands of doctors and also by many hospitals, and Government offices

Healthful Warmth

It has been definitely established by medical science that the radiant heat from a gas fire very closely resembles the heat rays from the Sun Careful tests have shown that the infra-red rays from the modern gas fire pass through the skin without causing the slightest irritation or discomfort and are absorbed by the blood stream. In other words, their action upon the body is exactly the same as the heat from the Sun



A Popular Model — especially suited for Ordinary Grates.

A Definite Aid to Ventilation

Of equal importance is the ventilating action of the fire. As the fire burns, heated air passes up through the chimney or flue. This automatically sets up a flow of fresh air into the room and thus establishes a system of ventilation in which there are no draughts and the air in the room is kept in regular circulation and also changed at frequent intervals. Some gas fires change the air in the room as often as six times an hour, whilst even the smallest type provide a sufficient number of changes of air to prevent it becoming vitiated. Combustion is perfect, for, as searching scientific tests have shown, no fumes or odors are produced

A Unique Design in Modern Gas Fires—particularly suitable for Open Fireplaces.

A Classic Model — typifying some of the latest ideas in design and finish.

Many Styles

In the manufacture of modern gas fires special attention has been given to architectural requirements. Many different models are available and they are made in types which are specially adapted for:—Old-fashioned fireplaces, register grates; modern styles of fireplaces and even rooms in which there is no fireplace The use of several different finishes in colour preserves harmony in furnishings and materially assists in the general scheme of interior decoration, etc.

Remarkably Economical and Wonderfully Cosy

Two of the most striking features of this method of heating, apart from those already described, are the bountiful warmth—which literally floods the whole room and the small fuel cost. For the average size room the cost is as little as 1¼d. an hour, or less than half the cost of electricity. In support of this it may be mentioned that with gas at 5/9 per 1,000 cubic feet, one penny buys 7,500 units of heat, whereas with electricity at the very lowest domestic rate, viz., 1¾d. per unit, one penny buys only 2,728 units of heat. The economical advantages of the gas fire are evident at a glance.

They Do Not Dry the Air

Unlike most other room heaters, the modern type of gas fire does not dry the air, the incoming fresh air keeping the humidity at normal level. It is for this reason that the air in a room where a gas fire is used never gets "heavy" and oppressive and does not cause irritation to the nose, throat or eyes. As the maintenance of normal conditions regarding humidity is one of the most desirable features in room warming, this fire warrants special consideration.

Leading medical and scientific authorities have said "the modern gas fire is one of the most hygienic room heaters in existence and it provides a system of ventilation which is even better than an open window." In Great Britain this system of heating is very widely used, and it is interesting to note that in London alone more than 5,000 medical men, as well as 90 per cent. of the public hospitals, day nurseries, creches and nursing homes, etc., heat their rooms with gas.

Easy to Install — Special Types

In dwellings equipped with a suitable chimney or flue, and which are already piped for gas, a gas fire—appropriate to its surroundings—can be readily installed at a comparatively small cost, Where no chimney or flue outlet is available, a specially designed 'built-in' type of gas fire can be installed with a minimum amount of alterations to walls, etc. In the case of ordinary grates — a different type of fire—also specially designed—can be easily fitted. It will be seen, therefore, that with very few exceptions, this hygienic and thoroughly economical system of room-warming can be readily used. The illustrations appearing on this page show four distinct types of modern gas fires, each designed to suit a particular class of setting Interesting information and data regarding these, and all other gas fires, will be willingly supplied

A Modern Gas Fire—"Built-in" Type—(at left). Specially adapted for rooms in which there is no fireplace.

(Continued on next page)

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GAS STEAM RADIATORS

The gas steam radiator provides an excellent system of heating for public buildings, schools, colleges, churches, and is in many respects superior to a central heating system. Several different makes of gas steam radiators are on the local market, some of them of long standing, others of more recent introduction to Australia, but, generally speaking, they embody one basic principle of heating.

Construction and Operation

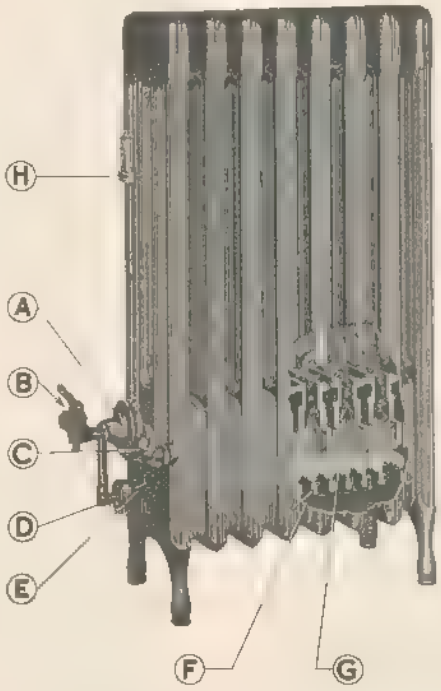
These radiators consist of a series of columns—as shown in the diagrammatic sketch—which are connected to a common bottom chamber and are joined together at the top. Water is introduced to the bottom chamber, beneath which is a row of specially designed bunsen burners. As steam is generated, the air in each loop is expelled through a vent. As the temperature in the radiator rises, the steam heated columns impart warmth to the adjoining air and set up a gentle motion in the air.

Automatic Control

The volume of gas supplied to the burner is controlled by an Automatic Regulator actuated by the pressure of the steam in such a manner that when steam has been generated to a suitable pressure the volume of gas is automatically reduced so as to allow only sufficient gas to be supplied to maintain the required steam pressure This renders a dual service, viz , it keeps the gas consumption down to a minimum and prevents overheating.

Safe

The combustion chamber is cast integral and it is designed of sufficient size to prevent any impingement of flame on iron, thereby ensuring absolute safety and no possible risks of fire danger There is no condensation or drip from these radiators and even when in constant use it is only necessary to replace the water at intervals of from 6 to 12 months. A safety valve prevents excessive steam pressure in the radiator



A Diagrammatic Sketch of a Modern Gas Steam Radiator.

A—Automatic Steam Regulator; B—Gas Cock; C—Filling Cup; D—Main Orifice Ell, E—Lighting Opening, F Burner, G—Steam Columns, H—Air Valve.

Economical

As only a small quantity of water is required in these radiators the quantity of gas used is comparatively small On the other hand, the Automatic Regulator ensures that no more gas than that actually required will be consumed

Location of Radiator

To ensure perfect combustion and to obtain maximum efficiency in regard to the circulation of heated air these radiators should be installed in the vicinity of windows, or along an exposed wall, so that cold draughts will be warmed on entering the room.

To Determine Size of Radiator Required

To determine the size of radiator required to heat a room the following simple method can be adopted. Take cubical content of room in feet, add on one-third and divide the result by 100. This will give the radiation feet. To find the size of radiator required it is necessary to consult one of the charts issued by manufacturers of these radiators, as the equivalent feet of radiation varies according to the height and width of radiators.

SECTION 4

GAS IN THE LAUNDRY

Gas Copper (Packed Type).

Although clothes washing has been brought to a stage of mechanisation per medium of washing machines, the modern gas copper and the associated washing tubs still maintain definite advantages over the mechanical method, especially as regards convenience and operating cost.

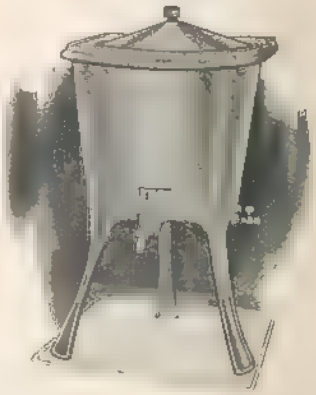
The gas copper is one of the simplest and one of the most serviceable of all gas appliances. It can be fitted in almost any laundry, takes up very little space, can be used at a moment's notice, and costs only 4d. to 6d. for gas for the average week's washing.

TWO TYPES

Gas coppers are made in two types, viz., packed and unpacked, and of these the former is the more efficient and consequently cheaper in the end. They can be obtained with or without a draw-off tap, but because of its great convenience the former are generally preferred.

MODERN FINISHES

With the introduction of the new mottled enamel—which is heat-proof and crack-proof — the external appearance of gas coppers has been completely transformed and it is now possible to secure them in a number of pleasing finishes.



Gas Copper (Unpacked Type). New Mottled Enamel Finish.

(Continued on next page)

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SECTION 5

REFRIGERATION BY GAS

Freezing with heat, however contradictory it may seem, is one of the latest and most noteworthy achievements in regard to the use of gas, and is yet another example of the versatility of this dependable clean fuel.

By the ingenious use of a simple chemical process, a most efficient system of gas refrigeration has been evolved. This system, which is exemplified by the Electrolux Gas Refrigerator, possesses three notable features, viz., it is perfectly silent and vibrationless, it has no mechanism or moving parts, and it operates at a very low cost.

A Tiny Gas Flame does all the Work

Its simplicity is nothing short of amazing. A tiny gas flame takes the place of all mechanism and does practically all the work. The heat from the gas flame —which is scarcely any bigger than a pilot light - changes the refrigerating liquid to vapour. A trickle of water changes it back again to liquid. This endless cycle of physical changes produces intense dry cold. There is nothing to go wrong and nothing to oil, repair or replace. The refrigerating liquid is hermetically sealed away for the life of the refrigerator It does not deteriorate and it cannot leak out.

Endorsed by Leading Architects

Architects throughout Europe and U.S.A. have examined the Electrolux Gas Refrigerator thoroughly and never before have they received a new product so enthusiastically In U.S.A. the number of gas-operated refrigerators now in use exceeds 100,000 "London Terrace," New York, the largest apartment building in the world, is equipped with 1,669 Electrolux Gas Refrigerators - one in every kitchen—and in scores of other buildings the number of these refrigerators exceeds the 50 mark.

In this refrigerator, "heat power" displaces motive action. Instead of the monotonous sound of a whirring, droning motor, everything is still and perfectly silent. Once the gas is lighted the freezing action starts—to continue endlessly. Should the flame go out the freezing action stops, but no damage is done. The gas automatically shuts off and cannot flow again until the burner is lighted.

The Gas-Operated Electrolux Refrigerator—Standard Model.

It will be noticed that the freezing unit occupies very little space and that the food chamber is particularly large. Trays for making ice are shown at the top right hand side. These trays can also be used for making delicious ice cream.

Perfect Food Preservation

Foods are kept in a perfect state of preservation by the intense, even dry cold of this refrigerator. Temperature fluctuations, which are almost inseparable from other types of refrigerators, are prevented by a device which automatically regulates the heat, and so keeps the temperature of the food chamber practically at one level day in and day out

Easy to Instal

Both the gas and water connections required are of the small type, so that the cost of installing the Electrolux Gas Refrigerator is negligible. Being compactly designed, this refrigerator requires a limited amount of floor space and can, therefore, be conveniently fitted in almost any kitchen

Cheaper than other Refrigerators

The Electrolux Gas Refrigerator has set a new low level in the cost of home refrigeration the weekly cost of gas needed being only about 2/-. This represents the full operating cost, as there is nothing to oil, wear, or repair, and the refrigerating liquid does not deteriorate or require renewal. As the average ice chest involves a weekly outlay of 3/- to 4/- a week, it will be seen that home refrigeration with gas is, like cooking and heating with gas, a definite form of domestic economy.

SECTION 6

INCINERATION BY GAS

Health requirements, coupled with the growing needs of modern building schemes, render it desirable, if not necessary, that refuse from dwellings—and more especially kitchen refuse—be disposed of frequently by hygienic means In other parts of the world domestic incineration has become firmly established and it is making rapid yearly progress Here in Australia it is not as yet very widely used, but the idea is rapidly gaining favour.

(For continuation of this Section see page 531 where further complete information is available)

(Continued on next page)

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SECTION 7

GAS APPLIANCES FOR HOTELS, CAFES, RESTAURANTS, ETC.

These appliances, which are termed "heavy duty" because of the type of service they provide and also to distinguish them from domestic appliances, cover almost the entire group of cooking and heating equipment for business purposes. They are specially designed to supply what might well be termed "bulk demand" and are made in types and sizes to suit the particular requirements of Hotels, Cafes, Restaurants and Boarding-Houses.

Practical Advantages

The advantages of "heavy duty" gas appliances may be grouped under three headings, viz., structural, technical and economical. Requiring neither substantial foundations nor solidly built chimneys, those used for cooking can be installed at practically no structural expense and in locations where the use of most other appliances would involve considerable expense or, on the other hand, be out of the question. In addition, they permit of increases in capacity or output without disturbance to appliances already in use.

Storage space for fuel, and provision for the handling and disposal of ashes are dispensed with altogether. These appliances, therefore, simplify and cheapen the cost of buildings in which foodstuffs are cooked on a large scale.

The technical advantages include. instant and regular supply of fuel, perfect heat control, simplicity of operation, sturdy construction, and high heating efficiency.

Combination Gas Hot Water, Tea and Coffee Urn.

An Aid to Architects and Builders

The whole tendency of "heavy duty" gas appliances is in the direction of simplification and improved results, and architects and builders will frequently find that many an otherwise stubborn problem in connection with the installation of cooking or heating equipment has a ready solution in these modern appliances.

More hotels, cafes and restaurants than ever before are entrusting their cooking and heating to gas, not merely because it is better and cheaper than other methods, but—in very many cases—because it means modernisation without heavy building or remodelling costs.

Appliances for Every Kind of Heating

"Heavy Duty" gas appliances include:— Cooking Ranges, Cafe Ovens, Hot Plates and Toasters, Hot Presses, Serving Tables, Stock Pots, Vegetable Steamers, Hot Water Systems, Urns, Boilers, etc.

The Australian Gas Light Co. will gladly furnish complete particulars in connection with the installation, use and operation of these up-to-date appliances.

A Gas Hot Press. Porcelain Enamelled Finish.

(at right) Modern Gas "Cafe" Oven.

Gas-Heated Vegetable and Pudding Steamer (at left)

A Modernly-Designed Triple Oven Gas Range (at right)

(Continued on next page)

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SECTION 8
INDUSTRIAL HEATING WITH GAS

The phenomenal growth of gas in industries during the last decade is one of the most outstanding developments in the industrial heating field. This modern method of heating received a tremendous impetus during the Great War and since then it has made such rapid progress that to-day there is scarcely an industrial heating process in which gas cannot be used with equal, if not greater, success than any other fuel. Its uses already number many thousands and they are being added to almost every day. Amazing growth in the use of industrial gas has taken place in Sydney metropolitan area. Since 1922 the number of industrial users has grown from approximately 200 to over 1,500 and the annual consumption of gas has increased from 29,200,000 cubic feet to 427,316,000 cubic feet.

Gas is pre-eminently the controllable fuel and this one factor alone has been responsible for its adoption in factories, etc., where precise heating temperatures are the very foundation of manufacturing success. Its unfailing reliability makes its use desirable in almost every heating plant, whilst its extreme cleanliness, simplicity and convenience give it definite and commanding advantages over those forms of heat which create smoke and dirt and require to be handled and stored. Important also are the capital savings brought about by using modern gas-heated equipment. Chimneys are done away with, heavy and usually expensive structural work is not required building space and also floor space are conserved. fuel storage accommodation is no longer needed and factory design can be developed along the most modern lines, particularly in relation to light, ventilation, cleanliness and labour saving. The smoke nuisance—one of the legacies of wasteful coal burning and also a health impairing agency diminishes in exact ratio to the number of industrial gas appliances installed. Viewed, therefore, in rational light the use of gas in industries is something which should be encouraged and supported by the entire community.

An Up-to-Date Heating Service

The Australian Gas Light Company maintains a most up-to-date Demonstration Section in which all modern types of industrial heating appliances are displayed and demonstrated. A staff of experienced technical experts is constantly employed and these officers will investigate the heating problems of manufacturers and furnish assistance and advice on all aspects of industrial heating. Architects and contractors are invited to consult our Industrial Fuels Department whenever they require information or advice regarding the installation of heating equipment.

SECTION 9
TESTING LABORATORY

A development of more than usual interest to architects and users of gas generally is the inauguration of a Testing Laboratory by the N.S.W. Commercial Gas Association. This Testing Laboratory is the first of its kind to be established by the gas industry in the British Empire and its principal purpose is to determine, by recognised standard tests, the efficiency and safety of all kinds of gas appliances Definite standards in connection with efficiency and safety have been laid down and a model of each appliance is tested. Appliances which fail to pass the prescribed tests, or to satisfy the standards, will in future not be sold by gas undertakings in New South Wales Every gas appliance which satisfactorily passes the Laboratory tests, etc., is issued with the Seal of Efficiency—a metal badge bearing the words "Seal of Efficiency — Testing Laboratory," and this Seal is affixed to the appliance. This hall-marking of appliances, which came into effect on June 1, 1931, furnishes an identification mark whereby efficient gas appliances can be readily recognised. Architects, builders, and users of gas are, therefore, asked to bear in mind the significance of this Seal and to buy only appliances carrying this hall mark. They are asked to communicate with The Australian Gas Light Company should they require information regarding any gas appliance which does not bear the "Seal of Efficiency"

"Seal of Efficiency"

COMPARISON OF FUELS

RESPECTIVE CALORIFIC VALUE OF VARIOUS FUELS, EXPRESSED IN BRITISH THERMAL UNITS, TOGETHER WITH COST PER B.O.T. UNIT.

	Assumed B.T.U. Value	Assumed Price.	Price per B.O.T. Unit of 3,412 B.T.U.'s
GAS — A.G.L.			
Minimum Industrial	540 per c. ft. gr	3/8.35 1,000 c. ft	2s [illegible]
Continuous Water Heating	540 per c. ft. gr	4/3.75 1,000 c. ft	327.0
Average Industrial	540 per c. ft. gr	4/7.4 1,000 c. ft	[illegible]
Domestic	540 per c. ft. gr	5/9 1,000 c. ft	43.6
LIGHT OILS.			
Kerosene	170,000 per gal	1/- per gal	3d
Kerosene	176,000 per gal	2/ per gal	4s [illegible]
[illegible]	166,000 per gal	3 per gal	[illegible]
ELECTRICITY — CITY COUNCIL			
Minimum Industrial	41 per unit	4d per unit	4d
Continuous Water Heating	41 per unit	6d per unit	6d
Average Industrial	41 per unit	1d per unit	1d
Large Departmental Stores and Establishments (Average)	[illegible] per unit	[illegible] per unit	2d
Large Residential Consumers, including Institutions (Average)	3.12 per unit	[illegible] per unit	[illegible]
Small Residential Consumers (Average)	41 per unit	9.3d per unit	[illegible]
Small Shopkeepers (Average)	41 per unit	[illegible] per unit	[illegible]
Maximum Domestic (Primary Units)	41 per unit	5 per unit	5d
Domestic (Balance of Units)	41 per unit	3d per unit	1.3d

NOTE—In this Table the Unit used for comparison the [illegible] is equal to 3,412 B.T.U.'s.

(Continued on next page)

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SECTION 10

SERVICE TO ARCHITECTS, BUILDERS AND OTHERS

"Good Public Service," the motto of The Australian Gas Light Company and the animating principle of its public policy, is well exemplified by the up-to-date facilities it has provided for supplying expert advice and assistance, and for disseminating information regarding the supply of gas and use of this dependable fuel.

Showrooms

Modern gas appliances for cooking and every kind of heating are displayed and demonstrated, in a practical way, in well-appointed showrooms, and similar facilities are provided in several suburban centres. Only the goods of reputable makers are handled, and the prospective buyer has the unique opportunity of seeing all makes of gas appliances under one roof. Model rooms illustrate the modernity of gas and its outstanding utility for cooking, water heating and room warming, and in a specially equipped "Hot Water Section" many of the latest types of gas-operated water heating systems can be seen in operation.

A Section of the A.G.L. Coy.'s Showroom.

Technical Service

Technical advice and assistance is provided by a staff of experienced experts. The service rendered by this staff is of a most comprehensive nature and includes the supply of information regarding the design construction, installation and use of all kinds of gas-using equipment. Architects and builders are asked to consult our heating experts whenever they desire particulars of any kind in regard to the use of heat for any purpose whatever.

Model Kitchen (at left).

Model Bathroom (at right).

Modern Laundry (below).

The A.G.L. Coy.'s Showroom.

A Complete Industrial Service

The Australian Gas Light Company's Industrial Department is well organised to render to industrial establishments expert advice and assistance on all kinds of industrial heating problems. Furnished by experts, demonstrations of practically every kind of heating processes are carried out free of cost. Our experts undertake to design, install and service gas heating equipment for almost every class of work.

Sizes of Meter and Service Pipe Required for Different Combinations of Gas Appliances.

Appliances	Service Pipe	Meter
[illegible] Cooker	[illegible]	5 ft.
[illegible] Cooker and Bath Heater	[illegible]	[illegible]
[illegible] Cooker and Copper	[illegible]	[illegible]
4 Cooker Bath Heater and Copper	[illegible]	[illegible]
5—Cooker Bath Heater and Fire (1)	1 in.	10 ft.
6 Cooker Copper and [illegible]		
[illegible] Cooker Heater Copper and Fire (1), (1 in. would carry it)	1¼ in.	10 ft.
8 Cooker Heater Copper and Fire (2)	[illegible]	20 ft.
9—Gas Ring	1 in.	5 ft.
10—Griller	1 in.	5 ft.

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G A S Appliances

THE METROPOLITAN GAS COMPANY

196 FLINDERS STREET, MELBOURNE

SHOWROOMS 2nd FLOOR TEL. C 8162 (9 Lines)

SUBURBAN DEPOTS.

Armadale, Caulfield, Collingwood, Carlton, Clifton Hill, Camberwell, Essendon, Glenferrie, Moreland, Moonee Ponds, Preston, Richmond, St Kilda, South Melbourne, Prahran

Also at Glenhuntly Road Caulfield.

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File No.

GAS The Fuel of Today

In the home, as in industry, Gas is the ideal fuel for all heating processes. Invisible, yet ever present, it is ready for instant service, day or night, simply at the turn of a tap Gas has come to mean Conservation. In the manufacture of Gas every constituent of the raw material coal—is saved, and thus a great natural resource is conserved. In the use of Gas there is no waste, labour is saved, and the burning of gas eliminates smoke, lets the sun shine in our cities, promotes cleanliness with all its benefits, and thereby conserves health and life. "The Age of Gas" is with us—a conservator and blessing to mankind

The Metropolitan Gas Company

is willing and anxious to render any assistance possible and to co-operate with Architects in every way in reference to gas service, gas appliances and their installation.

Domestic and Industrial Appliances Stocked

Gas Cookers
Bath Heaters
Storage Water Heaters
Hot Water Services
Gas Coppers
Radiant Fires
Radiators
Every kind of Burner
Lighting Equipment
Hot Water Urns
Toilet Stoves
Heavy-Duty Gas Cookers
Gas-Steam Boilers
Gas Furnaces
Heating Stoves
Gas-Steam Radiators
Air Compressors
Tinmans' Stoves
Confectioners' Stoves
Cafe Fountains, and
Special Burners of every description

DOMESTIC

Gas Cooking Stoves

At our showrooms we are displaying the largest variety of Gas Cookers—over 50 varieties—upright and elevated types, in nickel and enamel, or the new coloured porcelain enamels, fitted with pilot lighters, oven heat regulators, oven thermometers, etc., as required.

We have Frontline, Metters' and Parkinson's Cookers in sizes and finishes to meet every requirement The ovens are well insulated and enamel lined; all are fitted with "high efficiency" burners, complete oven equipment, and are subject to the service of free inspection and attention to burners at any time.

Gas Fires

Modern Radiant Gas Fires of improved type are available in sizes to suit every need finished in best art black, art bronzes, and coloured porcelain enamels. Suitable for fitting into register grates, well grates, or against tiled facings

Gas Coppers

The Gas Copper is a necessary adjunct in every up-to-date laundry, eliminating the dirt, smoke and drudgery associated with old-time copper fires. Finished in galvanised, white enamel, or dapple grey enamel, and complete with tap for emptying. Strongly constructed, with seamless copper pan, galvanised heat casing, and mounted on strong cast-iron legs, they are available in 12, 14, and 16 gallon sizes. Space required, 24 in wide (12 gallons).

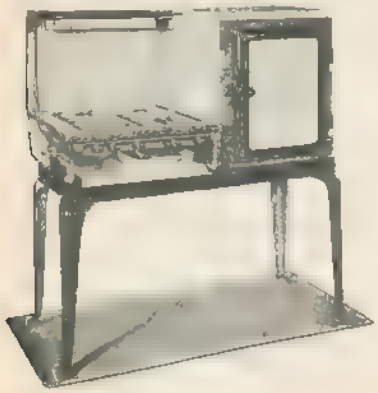
Space Required for Gas Cookers

The following recess spaces are required for—

Upright Cookers—from 24 in. to 33 in. in width,

Elevated Cookers—from 39 in. to 56 in. in width, according to size of cookers.

A depth of recess of 22½ in is sufficient. Height of opening—5 ft. average.



ARCHITECT'S SPECIFICATION

The contractor shall arrange with the Gas Company for the installation of gas service pipe of sufficient capacity to adequately provide for all requirements.

Note. Service should not be less than 1 in. diameter

INTERNAL PIPING.

Internal piping shall be constructed so as to be durable, substantial gastight, and of ample size for purposes required, using only best quality iron piping and fittings, etc. Piping should not be laid under tile, parquet or mosaic floors where it is at all possible to avoid it. If this is necessary, the size of piping should be doubled. Tees should be used instead of elbows to facilitate clearing of stoppages, and all pipes should be laid with a fall to the meter, wherever possible.

Note.—A schedule of fittings and equipment should also be provided.

(continued on next page)

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

Heavy Duty Ranges

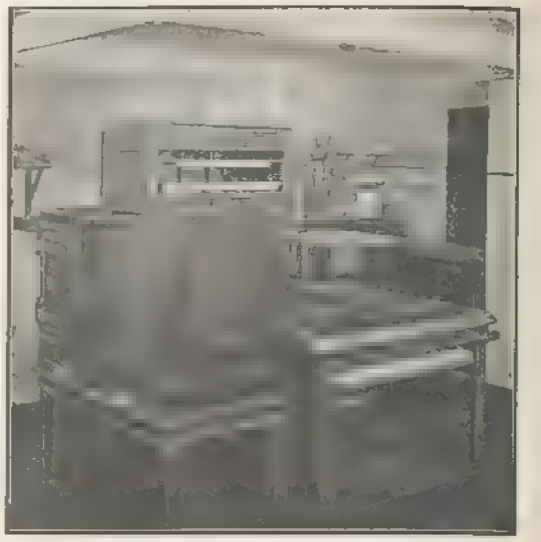
Gas is the accepted fuel for all commercial cooking purposes because of its reliability, economy, cleanliness and general efficiency. Of a total of 507 *establishments* in the Melbourne City boundary, 496 *use gas*, 225 to the exclusion of all other fuels, and in *only* 10 cases are other fuels used to the exclusion of gas. We supply a full range of Heavy Duty Ovens, Boiling Tables, Cake-baking Ovens, Gas Vegetable Steamers, Grillers, Toasters, Muffin Plates, Hot Presses—plain and with bain maries, Stock-pot Boilers, etc., etc. A complete illustrated catalogue, giving dimensions and prices, will be gladly supplied on request.

Planning and Advisory Service

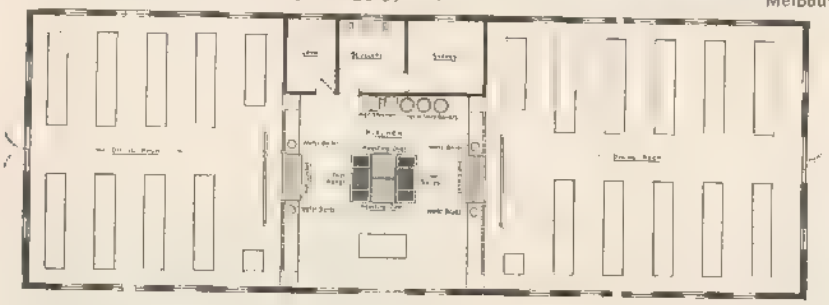
Our service to Architects includes assistance and co-operation in planning the layout of any large kitchen proposition. On receipt of a tracing of space available and details as to the class of trade and number of persons to be catered for, we would be pleased to draw up specification of suitable equipment, submitting illustrations, quotations and plotting in a suggested layout which would provide for efficient and economical operation of kitchen.

We have had a long and varied experience in this work and are glad to be of assistance to Architects in any matters relating to the selection, planning and operation of commercial kitchens for cafes, clubs, restaurants, staff dining-rooms, hospitals, institutions, etc.

We will also quote for complete installation of gas service and supply to appliances, if required, making ample provision for adequate gas supply, etc.



A typically compact Gas Cooking Set at the Melbourne Library Cafe Kitchen.



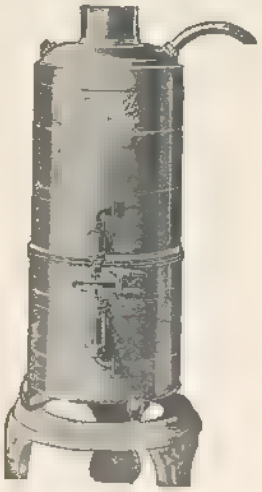
A standard layout of Gas Kitchen and Staff Dining Room to provide for 500 employees.

For Cottage and Villa Properties—

an economical and efficient

HOT WATER SERVICE

For the Kitchen and Bathroom is provided by



The "RAPID" Gas Bath Heater.
Price - - - - - £6

"The Rapid" GAS BATH HEATER and - "The Briar" AUTOMATIC WATER HEATER

Provides a hot bath in 10 minutes at a cost of 2d., and a hot shower in 10 seconds, costing less than 1d.

The "RAPID" is non-contact type, copper nickel plated, and fitted with interlocking gas and water taps.

Easily fitted over the kitchen sink, the 1-gallon "BRIAR" will supply scalding hot water at the turn of a tap—sufficient for all kitchen sink needs—and the cost of operating it is less than that of any other water heater.

We would be pleased to demonstrate these Heaters in operation at our Showroom

The "BRIAR" Gas Water Heater 1 Gallon Size. Price - £6/15/-

(Continued on next page)

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

THERE IS A GAS WATER HEATER FOR EVERY HOT WATER REQUIREMENT

Gas Water Heaters comprise Automatic Storage Heaters, Automatic Coil Heaters, Geysers, Circulating Boilers, Cafe Fountains, Sink Heaters, etc

The "Briar" Automatic Water Heater

is a compact, self-contained unit, well insulated, self-acting, available in sizes from 1 to 50 gallons to suit every purpose. The cost for gas is approximately 3.9 c.ft. per gallon of boiling water drawn off

Construction

Super heater and storage tank of hard-rolled copper, all joints well made, outer casing of galv. iron well lagged with powdered cork Bray's flat-flame burners used for heating (no fumes), controlled by a well-constructed and easily adjusted thermostat.

Operation

The heat of gas burners is applied to the inside surface of lower or "heating" tank and underside of upper or "storage" tank. Hot water is stored in upper tank ready for use. Cold water enters lower tank and is heated, heating upper tank by circulation. The thermostat element extends into upper tank and turns gas to main burner on and off, according to temperature of water. A pilot light burns continuously and serves to maintain temperature of water and ignites burner when necessary.

Recommended Sizes

For Domestic Kitchen Sink—1 gallon size.
For Cafe and Restaurant Sinks 3 to 15 gallons.
For Small Hot Water Service (4 points)—7½ to 10 gallons.
For Larger Hot Water Service (6 to 8 points)—10 to 20 gallons.

Method of Installation

The 1-gallon "Briar" is usually fixed by securing the supporting brackets to the wall over or adjacent to sink or basin. Usually to supply one outlet only, it is connected direct to water service. When supplying more than one hot water point, it is necessary to provide low-pressure water feed by means of a ball-cock cistern fixed above heater, as the "Briar" is not constructed to stand water pressure Tank should be six to ten feet above heater Larger sizes are designed to stand on a shelf or bracket, gas connected to burner, and an expansion pipe taken from top of heater up over cistern. Hot water supply is taken from a tee in expansion pipe and carried, with branches, to various points as required. When it is necessary to fix feed tank more than 10 feet above heater, a "heavy-duty" model must be used.

TABLE OF DIMENSIONS OF GAS CONSUMPTION OF "BRIAR" GAS WATER HEATERS.

Size in Gals Cap	Heating to 212° Fah minutes	Heating to 212° Fah c ft Gas	Output per 24 hours	Height inches	Diameter inches	Gas Conn. inches	Water Conn. inches	Water Outlet inches
No 1	25	6	57	27	11	½ B	⅜ B	⅜ B
No 3	[illegible]	13	171	37	15½	½ B	½ B	¾ B
No. 5	3[illegible]	19	240	40	17	½ B	½ B	¾ B
No 7½	35	33½	307	48	17	½ B	½ B	¾ B
No 10	40	41	360	43	19	½ B	½ B	¾ B
No 15	4[illegible]	5[illegible]	540	48	19	½ B	½ B	¾ B
No. 20	45	7[illegible]	640	57	23	½ B	½ B	¾ B

Also made in 30 gals., 40 gals., and 50 gals. capacity. Particulars on request

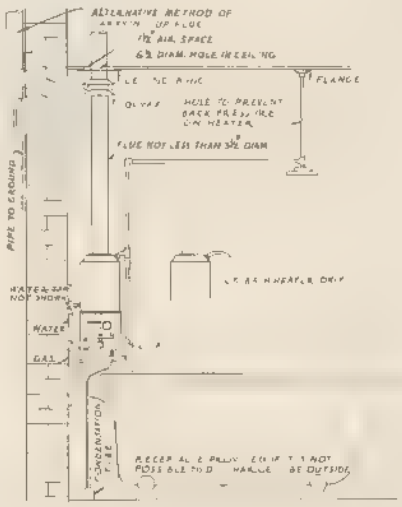
"Rapid" Gas Bath Heaters

The "Rapid" is the most efficient (by test) and best value Gas Bath Heater on the market. Strongly constructed of copper, tinned waterways, nickelled exterior, non contact type. Heated by six high-power bunsens and lighted by a swing-in-pilot. Easily adapted for Hot Shower.

Sizes and Capacities

No 1 "Rapid," 22 in. high, 9 in. dia. Delivers approx. 1½ galls heated 50 deg. Fah. above temp. of cold water.

No. 2 "Rapid," 23½ in. high, 12½ in. dia Delivers approx. 2½ galls. heated to 50 deg. Fah. above temp. of cold water.



BRIEF SPECIFICATION FOR FIXING "RAPID" GAS BATH HEATER

Heater should be fixed perfectly upright on cast iron bracket or stand at foot end of bath, with outlet projecting to ensure water flowing into bath. Gas and water control taps to be on side nearest the user Bracket should be screwed to a bevelled board securely fixed to wall; if brick, by means of wall plugs.

GAS SUPPLY must be of ample size to serve heater in addition to other appliances. A ⅜-in. iron or ⅜-in. compo. branch should be run from near meter outlet to heater, or from any ¾-in. or larger supply available. A control gas tap should be fixed close to heater to facilitate disconnection of heater for cleaning without interfering with other appliances.

WATER SUPPLY should be ⅜-in. to stop cock and ⅜ in. N.P. brass from cock to heater. All water pipe, fittings and cocks must be tested.

CONDENSATION should be conveyed in brass or compo. pipe from outlet through floor or outside wall. If this is not practicable, condensation should discharge into receptacle provided in bathroom for that purpose.

FLUES.—Method of flueing depends on position, etc. No. 1 Heater requires 3½-in diameter flue and fittings; No. 2 size. 4½ in. diameter Illustration shows two methods and, where practicable, flue should be carried up at least 2 ft. above roof and fitted with effective draught proof cowl. A "louvre" should be inserted 3 in. below ceiling to assist ventilation, prevent down draughts, and facilitate disconnecting for cleaning. Air space of 1½ in. to be provided between flue and woodwork, the large hole in ceiling being covered by metal ceiling plate. All flue joints should be soldered and piping painted with aluminium (inside) and two coats oil paint (outside).

ROOFS pierced for flues should be well flashed.

Send for Copy of Complete Standard Specifications for Fixing "Rapid" Bath Heaters.

(Continued on next page)

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

"GAS-STEAM" Gas-heated Steam RADIATORS

Gas Heated Steam Radiation

Gas-Heated Steam Radiators have been used in England for many years, heating all classes of buildings, and have proved their economy, full control of generous heat, and entire freedom from the need for attention after once being fitted. They are built for service, and may be relied on to give a long life of usefulness under all conditions, with a minimum of expense and attention.

"Gas-Steam" Radiation is the ideal system of heating for Churches, Halls, Cinemas, Showrooms, Factories, Storerooms, etc.

Description

"Gas-Steam" Radiators are complete systems using gas for fuel and delivering steam heat. No central heating plant or steam piping is necessary. Each radiator is a complete steam plant within itself and operates independently from all other radiators. Each radiator burns its own fuel and generates its own steam heat. Thus, only those radiators need be operated in the rooms where heat is required.

Construction

"Gas Steam" Radiators are made of cast iron; in appearance they are much like ordinary radiators. The sections are so designed that the upper part forms a steam radiating surface, directly beneath the radiating surface (see section) is a water chamber. The water should be checked once every year, and this, together with regulation of burner, is done free of charge. Water is supplied through a filling-cup at the end of the radiator. The gas burner is under the water chamber and is completely enclosed. Each radiator is equipped with an automatic control valve, water-filling plug, draining cock and air vent. All loops and other parts are metal, making a permanent and practically indestructible appliance.

Automatic Control

When heat is required the gas is lighted. Steam is raised in a very few minutes. The automatic control valve, acted upon by the steam pressure, regulates the size of the gas flame and so automatically controls the gas consumption, thus preventing waste.

Installation

Easily installed in any desired position, each radiator is self-contained, needing only a gas supply connection (½ in.) and flue outlet.

Table of Heating Capacities

	Per loop	Per Radiator 4 loop	6 loop	8 loop
	c.f.	c.f.	c.f.	c.f.
Workshops and Factories	700	2800	4200	5600
Churches, Public Halls, Sale Shops, etc.	610	2440	3660	4880
Schools, Entrance Halls, Stairways, etc. . .	540	2160	3240	4320
Offices, etc.	505	2020	3030	4040

Dimensions and Prices

No of Tubes	Width Overall	Height	Price Art Black
4	13½ ins.	39 ins.	£10 10 0
6	18½ ins.	39 ins.	£14 10 0
8	23½ ins.	39 ins.	£17 10 0

Bronze Finish 2/6 per tube extra.

Estimating Size Required

In estimating for the heating of churches and similar lofty buildings, it will be found sufficient if 15 feet only of the height is taken into account. Where there is a gallery, this should be taken as a separate apartment.

The figures given in the above tables are based upon average conditions. In certain cases, such as shown below, there may be special conditions which require additional Radiator Loops.

Allowances for Special Conditions

Section showing gas burner, water level, filling plug, draining cock, and automatic control valve

Add 10 per cent. to the total number of loops required for the following special conditions:—

1. Rooms or shops exposed to the South or West.
2. Rooms or shops having more than one outside wall, for each outside wall in excess of one.

Note.—This applies to rooms or offices in buildings made up of apartments, but does not apply to large open interiors, such as Churches, Halls, Factories, etc.

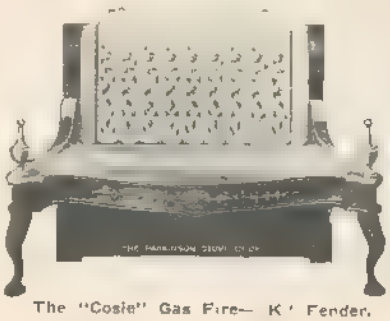
3. Rooms or shops having an unusual area of glass (windows, etc.), add the equivalent of two extra Radiator Tubes for each 80 square feet of glass more than the normal, the normal average being 20 square feet of glass per 1,000 c.f. capacity.
4. Corrugated iron walls, if well lined with match-boarding, or similar material.
5. Corrugated iron roof, if well lined.
6. When the ceiling of the room or shop is the roof, well boarded and plastered.
7. When the ceiling is a visible roof, not wood lined, but with felt beneath the plates or tiles.

Add 20 per cent. to the total number of tubes required.

Representative Installations

Melbourne University (Several Departments).
Vaughan House, Melbourne.
Queen's Hall, Collins Street, Melbourne.
Ball and Welch's Workrooms.
Buckley and Nunn's Workrooms.

Gas-heated Steam Radiators have the approval of the Department of Public Health, Melbourne.



The "Cosie" Gas Fire— K' Fender. A popular type for "well" grates.

RADIANT GAS FIRES flood the room with flowing radiant heat in one minute—they heat like the sun and ventilate as they warm. Scientifically constructed and hygienically perfect, there are many handsome designs to harmonise with every type of interior decoration.

Send for our new illustrated Catalogue.

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SECTION Q

[Containing S.A.A. Filing Section No. 30]

AIR CONDITIONING, HEATING AND VENTILATING

RAMSAY

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

30c

S.A.A. File No.

WM. BEDFORD LTD.

476-490 LONSDALE STREET, MELBOURNE

Agents For

THE BEESTON BOILER CO. LTD.

NOTTINGHAM, ENGLAND

BEESTON
BOILERS
RADIATORS

[For Other Products, See Index]

Products

Robin Hood Boilers; Domestic Boilers, Beeston Boilers; Royal Boilers; Boiler Accessories, Princess, Royal, Panel and Panel-wall, and Hospital Radiators and Accessories; Valves; Pipes; Baffles; Grates; Towel Rails, etc., etc.

Selection of Boilers

This is a most important matter. Any given duty can be performed by boilers of widely different sizes. Generally speaking, the larger the boiler adopted for a certain duty, within limits, the lower is the fuel consumption. When a relatively small boiler is adopted for a relatively high duty, the fuel consumption is extravagant because the heating surface of the boiler is not big enough to absorb all the heat generated, and an unduly large proportion of the heat escapes to the chimney The consequent high temperature in the chimney maintains a fierce draught in the furnace, producing clinker on the firebars and rapid deterioration of same.

Beeston Domestic Boiler with Oil Burner.

Boilers for Fuel Oil

The advent of oil as boiler fuel has given added popularity to Beeston Boilers, as every size and type of Beeston Boiler is constructed so that it may be fitted with an oil burner, or it will burn solid fuel, enabling the owner at any time to change from one to the other without the bother of alterations to the boiler. The particularly large and deep fire pot, roomy flues, and long flame travel, which characterise the Beeston products, give the utmost efficiency in fuel oil burning. The maximum amount of oil which can be efficiently burnt in the combustion chamber of a heating boiler is 3 lbs. per hour per cubic foot of combustion space.

ROBIN HOOD SECTIONAL BOILERS

Robin Hood Sectional Boilers are built up from three to twelve sections, and jointed with heavy screwed malleable nipples, having outlet for smoke pipe and flow and return tappings at back. An awkward method of boiler construction so often encountered is the use of one long bolt throughout the length of the boiler, making the lugs liable to break off as the result of the great expansion and contraction of the boiler metal. Overcoming this hazard, Beeston Sectional Boilers are connected section to section by a series of nuts and bolts, enabling one section to be lifted out of its position with the minimum of trouble.

Boilers should be mounted on perfectly air-tight brickwork to increase the depth of the ash pit and lengthen the life of the firebars. The thickness of the boiler metal varies with the model, so that weights of the various types differ accordingly. We do not recommend boilers to be worked to their full capacity; a size larger than actually required should always be provided. Types available are: "Major," "New Senior," "C Pattern," "F Pattern," "General," and "Junior," as shown in the illustration, and particulars of these, together with details of dimensions and capacities and given in the new 1932 Beeston Catalogue, which is now available, and will be given [illegible] pleasure to any applicant.

Group of Robin Hood Sectional Boilers.

DOMESTIC BOILERS

Beeston Boilers are perfect for domestic use, having a neat appearance and being easy to keep clean, both internally and externally. A splendid feature of these boilers, and one that should be particularly noted, is that they have a Waterway Top, which means that the water in that section receives an intense amount of heat by comparison with the water in boilers which have no waterway actually above the fire, and thereby supplements the efficiency of the boilers. All boilers also have part Waterway Front, which forms considerable protection for the cast iron front, and is also most valuable heating surface. There is no waterway tube over the clinker door, and consequently no trouble from sediment and deposit at this point, where also a protection fire-brick is fitted inside.

Group of Beeston Domestic Boilers.

Beeston Domestic Boilers are manufactured in "open fire" and "closed" type, as well as with special apparatus for heating out-houses, such as garages, green-houses, etc. Boilers for hot water supply are Bower Barffed, which is a chemical process carried out on the lining of the boiler to prevent corrosion and discolouration of the water. The smoke outlet is at the top of all Beeston Boilers, and is a socket to take spigot end of a smoke pipe. Damper is slide pattern. Inside depth of smoke socket 1¾ in. A distance piece is fitted to all smoke outlets, which raises the damper 1¾ in. above top of boiler and facilitates the working of damper slide, especially when the boiler is covered with composition. To obtain the best results, boilers, flow and return pipes, and cylinders should be covered with a good non conducting material. Automatic damper regulators can be fitted to Domestic Boilers, and removable ash pans can be supplied. In districts where the water is highly impregnated with lime, the boiler should be cleaned two or three times a year.

The Beeston company has made available a larger size domestic boiler, the F X., which is the largest domestic unit made. This is particularly suitable for large apartment houses, hospitals and hotels, and will undoubtedly be welcomed by engineers and architects, who in the past have had to specify sectional boilers.

Sectional boilers are unsuitable for hot water generation, and, in addition to their being more costly in up-keep than domestic boilers, they do not afford ready facilities for cleaning.

It is claimed by their manufacturers that some boilers will produce 11,000 B.T.U.'s per square foot of heating surface. Although the Beeston closed type, through the employment of the open waterway, is the most efficient heating unit manufactured, the Beeston Boiler Co. Ltd., insist that their boilers shall be rated at 10,000 B.T.U.'s only. The advantages of this reserve heating power of the Beeston Boilers are obvious. Comparisons of the duties of domestic boilers must be made from the amount of square feet of heating surface within the fire-pot.

(Continued on next page

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The capacities are shown in the following table —

TABLE OF CAPACITIES—BEESTON DOMESTIC BOILERS

Size	Outside Measurements over all: Height Inches	Width Inches	Depth Inches	Dia. of Smoke Pipe	Sq. ft. of Heating Surface	B.T.U. per Hour for Hot Water Supply*	Capacity Gallons per Hour: 60 deg. to 100 deg.	60 deg. to 150 deg.	60 deg. to 212 deg.
OX	28½	16½	15¾	4½	4½	43 000	8	62	23
AX	31	18½	17¾	4¾	5½	53,200	133	76	35
CX	31½	18	20½	5	7½	76,000	189	108	50
DX	36½	21¾	21½	5	9¾	91,300	227	130	60
EX	39½	24¾	27	5	12½	125,000	312	179	82
FX	43½	24¾	27	6	15½	155,000	388	221	102

*Based on 10,000 B.T.U. per sq. heating surface

INSTALLATION DATA

Pipe sizes should be carefully considered, as the efficiency of the apparatus largely depends on the design and fixing of the pipes. The boiler stand must be fixed on a level brick or concrete foundation, and if possible, raised one course of bricks to add depth to the ash pit. The chimney must be carried higher than the surrounding buildings and contain a separate flue for each fire. Connecting pipes to the boiler, both flows and returns, should not be built into the wall close to the boiler, but allowed free room for expanding. Do not fix the cold water supply direct to the boiler, but in the return at least ten feet away. We recommend all sectional boilers to be fitted with an open air pipe direct from the boiler; "Majors" and "Seniors," 2 in. diameter; "C" and "F" Patterns, 1½ in. diameter; other boilers, 1¼in. diameter.

RADIATORS

Types Available

Royal Radiators, specially built for domestic installation.
Royal Radiators for offices, banks, factories, warehouses, theatres, etc.
Royal Window Radiators for placing under seats and windows.
Royal Curved Radiators.
Beeston Hospital or School Radiators; Passage and Domestic Radiators.
Beeston Wall Radiators.
Princess Window Radiators.
Princess Radiators.
Beeston Radiant Panel Radiators, Royal Wall Radiators.

Features

It has been proven by independent tests that the Beeston Radiator has a higher heat transmission than any other type, and the British characteristics of long life and service are particularly noticeable in these products. The group of Royal type Radiators shown in this page gives an idea of their sturdy and pleasing appearance. There are sizes, styles and shapes of radiators stocked for all classes of buildings. All radiators are fitted for hot water unless specially ordered for steam. Radiators can be supplied without feet in all sizes, but unless otherwise specified, feet are provided. Ask us to send you a catalogue containing full details. A table of the heating surfaces in square feet per section of various types of Beeston Radiators is shown at the foot of this page.

ROYAL RADIATORS

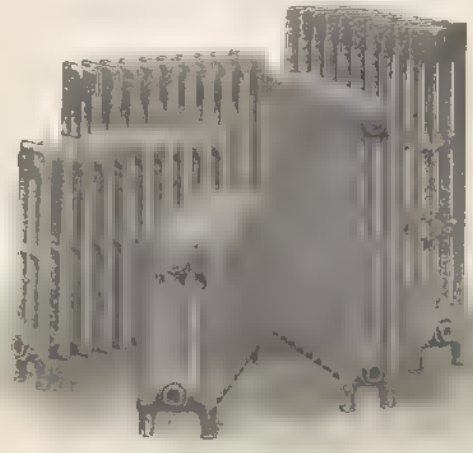
Unless otherwise specified, these radiators are tapped 1½ in. at top and 1¼ in. at bottom, and bushed to 1 in. when they contain 50 feet, and to 1¼ in. when they contain over 50 feet. Each section is connected with 1¼ in. right and left hand screwed malleable nipples at bottom and 1½ in. at top. Radiators are tapped for ⅛ in. air cock. Radiators over 24 loops despatched in two pieces. Radiators of 20 loops and over supplied with leg section.

CURVED RADIATORS

Made in Royal, Princess and Hospital patterns, in standard widths and heights up to three feet. Radiators are not made to a less curve than two feet radius. When ordering, give radius of curve and skirting. Unless otherwise specified, radiator is designed to be placed 1½ in. from skirting.

HOSPITAL RADIATORS

Specially designed for use in hospitals and schools, this radiator is 1½ in. wide at narrowest point between the loops, which enables every part to be cleaned easily, and allows greater air connection between columns. It has no beads or projections of any description, except the bosses for connecting to pipes, and therefore is absolutely hygienic and has no receptacles for dust. Radiators are also made hinged. Water capacity, .15 gallons per square foot heating surface. Each section is 7 in. wide. Width of legs is 7½ in.



A Group of Royal Radiators.

BAFFLE PLATES

Baffle Plates, which may be easily detached for cleaning purposes, are obtainable for fitting to radiators. Plates are hung on radiators with patent clip and bolt.

BEESTON RADIATOR VALVE

Beeston Radiator Valves can be fitted to any pattern radiator, except wall type. They project 2 3/16 in. from radiator when closed, and are easy to work without stooping. They increase the efficiency of the radiator and are quick in action: two turns close the valve.

PROMINENT INSTALLATIONS

Central heating by Beeston products is a method which has been proved far superior to heating by such means as electricity, plenum, gas and steam because of low maintenance cost, nominal fuel consumption, efficiency, and pleasing and natural warmth and long life. For these important reasons, Beeston products have been installed in the apartments of Their Majesties at Buckingham Palace; and their merits are recognised by leading engineers and architects, as shown by the following partial list of a few prominent installations recently carried out:—

Commercial Bank of Australasia Ltd., Melbourne. Architects: A. & K. Henderson.
Bank of Australasia Ltd., Melbourne. Architects. A. & K. Henderson.
National Bank of Australasia Ltd., Melbourne. Architects: A. & K. Henderson.
Debenham's Buildings, Melbourne. Architects: A. & K. Henderson.
Temperance & General Mutual Life Society, Sydney and Bendigo. Architects: A. & K. Henderson.
Howey Court, Melbourne. Architect: H. A. Norris.
Coles' Building, Melbourne. Architect: H. A. Norris.
Kellow-Falkiner Buildings, St. Kilda. Architect: H. A. Norris.
Residence, G. Nicholas, Macedon. Architect: H. A. Norris.
Ports and Harbour Building, Melbourne. Architects: Sydney Smith, Ogg and Serpell.
Austin Hospital. Architects: Stephenson and Meldrum.
State Theatre, Melbourne. Architects: Bohringer, Taylor & Johnson.
State Theatre, Sydney. Architect: H. White.
Regent Theatre, Fitzroy. Architect: C. N. Hollinshed.
Victory Theatre, St. Kilda. Architect: C. H. Ballantyne.
And the majority of schools, hospitals, etc., erected by the Victorian and N.S.W. Public Works Departments in recent years.
Shell Building, Melbourne. Architects: A. & K. Henderson.
Shell Building, Adelaide. Architects: MacMichael & Harris.

TABLE OF HEATING SURFACES IN SQUARE FEET, PER SECTION OF VARIOUS BEESTON RADIATORS

Royal			Princess			Hospital		Hospital	Wall Type		Royal Wall Type	
3 Col.	4 Col.	5 Col.	1 Col.	2 Col.	5 Col.	7in. Wide		5in. Wide	ins.	sq. ft.	ins.	sq. ft.
sq. ft.	sq. ft.	sq. ft.	sq. ft.	sq. ft.	sq. ft.		sq. ft.	sq. ft.				
36	3	4 1/3	5 1/5	36	3 4/10	4¾	—	36	3 3/5	2 3/5	22½	7½
30	2½	3½	4 3/10	36	3 1/10	4	5½	30	3	2 1/5	14½	8
24	2	2¾	3 2/5	30	2 6/10	3½	4½	24	2½	1¾		
18	1½	2	2½	24	2	2½	3 1/3	18	1½	1 2/5		
				18	1½	1 4/5	2 1/3					

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S.A.A. File No.

NATIONAL RADIATOR COMPANY LTD.

HULL, ENGLAND

AGENTS:

JOHN DANKS & SON PTY. LTD.

MELBOURNE:
391-403 BOURKE STREET
'Phone: No. 8380 Central
(12 lines)

SYDNEY
324-330 PITT STREET
'Phone: No. M.2751

"IDEAL"

SECTIONAL BOILERS

The success of the heating installation lies chiefly in the boiler. Effective operation, low cost of maintenance, i.e., fuel, labour and repairs, depend so largely upon its efficiency, reliability and durability, that the greatest care should be exercised in making a selection.

Unquestionably cast iron of suitable mixture is the best metal of which to construct heating boilers, owing to its greater resistance to corrosion than wrought iron or steel, and the fact that it can be produced in almost any shape, thereby enabling the heating surface to be fashioned in the most effective form for absorbing and transmitting heat.

Laboratory tests are made of all iron used for Ideal Boilers, special bars being cast every working day for analytical and test purposes, while the boilers before leaving the works are subjected to a hydrostatic test pressure of 100 lbs. per square inch.

The following description of the main features of Ideal Sectional Boilers will show how the requirements of modern heating practice have been studied and provided for in their design and manufacture.

Ideal Britannia Boilers for Water

The Ideal Britannia Boiler is an efficient and adaptable boiler of the direct draught type and consisting of sections assembled by means of three nipples. These rounded tapered cast iron nipples ensure an absolutely tight metal to metal joint, without the use of red lead or other compound.

Wide Waterways. The sections have wide waterways, permitting free circulation, and are shaped to present a flat surface in the fire-box some distance above the grate level, thus facilitating cleaning and preventing corrosion.

Water-cooled Grate Bars. Each section in the Nos. 2 K, 3-K and 4-K Series boilers is cast complete with water-cooled grate bars, which cannot burn out and consequently do not require renewal.

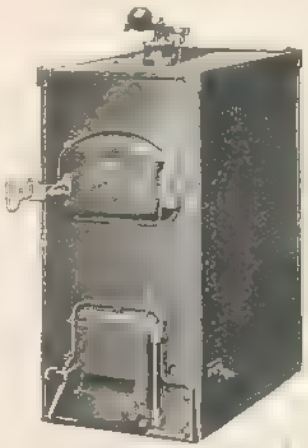
No Separate Base.—No separate base is needed for Ideal Britannia Boilers, as each section is cast with an extension which forms the ashpit.

Perfectly Smoke-Tight Smoke Box.—The beaded edges of the sections are ground and faced to ensure a perfectly smoke-tight fire box without the use of putty. The beaded edges prevent an accumulation of soot and sulphurous matter between the sections, with consequent rust growth and risk of fracture.

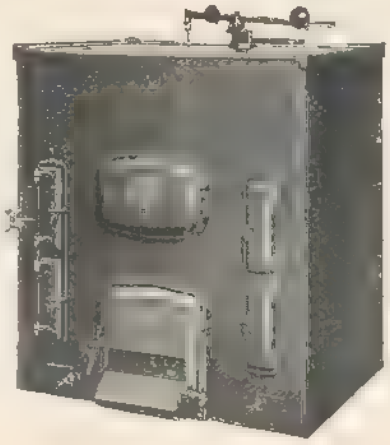
Noco Doors.—The patent Noco doors, peculiar to Ideal Britannia Boilers, provide a pre-heated secondary air supply which increases the efficiency by not less than 5 per cent. As the air passes between the door linings and the plate, it prevents any possibility of their burning out.

The Arrangement and Area of the Flues.—The arrangement and area of the flues in Ideal Britannia Boilers give a travel of the gases sufficient to complete the absorption of the maximum amount of heat developed by the combustion of fuel.

Insulating Galvanised Steel Jackets. Insulating galvanised steel jackets can be supplied for all Britannia Boilers. They conserve heat and give a neat and durable finish to the boilers. Corner key strips enable them to be quickly fitted. **Sizes.**—Ideal Britannia Boilers are made in 29 sizes, with capacities ranging from 280 to 8,210 sq.ft of direct radiation.



No. 2 K, 3 K and 4 K Series



No. 2-H Series for Water

Ideal "H" Series Boilers for Water and Steam

Ideal "H" Series Boilers are designed for use either as water or steam boilers. The sections are made in halves extending to the ground and forming the firebox and ashpit. No separate base or brick setting is required. This construction facilitates handling and erection.

The Water-Cooled Grate Bars. — The water-cooled grate bars, besides providing additional heating surface, prevent waste of fuel by limiting the formation of clinker. They cannot burn out and consequently need no replacing.

Side Flues. The boilers are designed with side flues, an arrangement securing the utmost absorption of heat from the gases of combustion. Excessive or wasteful combustion is practically impossible.

Exposed Fire Surface is Flat. The exposed fire surface is flat and therefore easy to clean, and is backed by waterways of ample size to give the maximum quantity of water per unit of heating surface in the firebox.

Compact. The boilers are very compact and low in height. Considering the power of the boilers, the positions of the connections are very low, an advantage which is enhanced by the flow outlet being at the rear. This feature makes them particularly suitable for fixing in boiler rooms of restricted height or area. In larger sizes the boilers can be adapted for use with underground flues.

Easy Firing and Cleaning. – All sizes are provided with doors of ample dimensions for cleaning and firing. In Nos. 3 and 4 Series an additional firing door on top can be fitted for overhead feeding.

Insulating Galvanised Steel Jackets. Insulating Galvanised Steel Jackets are supplied as a standard fitting with the Ideal "H" Series Boilers.

Automatic Regulation.—Automatic regulation of the draught can be arranged by means of the Ideal Damper Regulators (made both for water and steam boilers). **Sizes.**—Ideal "H" Series Boilers are made in 23 sizes, with capacities ranging from 750 to 10,950 sq. ft. of radiation when used for water, and 420 to 6,185 sq. ft. when used for steam.

(Continued on next page)

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Ideal Boilers for Oil Fuel

Ideal Britannia and "H" Series Boilers have been proved by actual performance tests at various rates of combustion to be suited admirably for oil burning

For efficient oil burning it is necessary to have combustion space of great capacity in order to accommodate the large hot gas volume caused by the intimate mixture of oil and air. Ideal Boilers have ample space for burning the quantity of oil necessary to produce their catalogue ratings with the highest efficiency. In addition, the flue travel of both the Britannia and "H" Series Boilers, particularly when improved by the insertion of special baffles, which are provided with these boilers, ensures an effective absorption of the heat of the gases and a reasonably small chimney loss.

When required for oil burning, the boilers are supplied without grate bars. With some burners the regular sections with water-cooled grates can be used, the only protection necessary being a layer of 1-inch firebrick on the grate, the ashpit floor being covered with insulating bricks. The boilers at any time can be converted for burning solid fuel

DOMESTIC BOILERS

Ideal Domestic Boilers—for Hot Water Supply

By installing an Ideal Domestic Boiler an ample supply of hot water is secured day and night at a much lower cost in fuel than any other known method. The large number of Ideal Domestic Boilers now in operation is evidence of their economy and efficiency.

No. 5D Domestic Boiler

Construction. — These boilers possess all the advantages, at a much lower cost, of a wrought iron boiler. They have bolted tops and large waterways to which the several flanged clean out openings give easy access for the dislodgement and removal of incrustation, without disturbance of the existing piping and smoke pipe connections

The whole of the fire surface is backed with water, and is therefore most effective and cannot burn out. The waterway extends to the floor line, and is nowhere less than 3 ins wide The return tappings are 7 ins., from the bottom of the firepot, so that if a quantity of sediment collects at the bottom of the waterway this will not be disturbed by the ebullition of the water within the boiler itself, and a clean supply in the system will always be available.

Automatic regulation can be obtained by the application of No. 802 Ideal Damper Regulator

Bower-Barff Treatment. In districts where the water contains vegetable or mineral acids in solution, it becomes necessary to prevent the discolouration arising from the corrosion otherwise inevitable with any kind of iron or steel boiler. The Bower-Barff process in making iron rustless, as specially applied to Ideal Domestic Boilers, effects a permanent chemical change in the iron, rendering it proof against the corrosive action of any water supply

Villa No. 3D. —This boiler has been specially designed to meet the demand for a small and inexpensive type for use in districts where the water contains little or no lime in solution with a consequent absence of deposit and necessity for cleaning.

Ratings, Dimensions, etc.

No	Height Floor to Top plate Inches	Dia. of Boiler Base. Ins.	Dia of Base Plate Ins.	Hot Water Supply Only						Tappings Flow and Return
				B.T.U pr. hr	Gas per hour					
3D	[illegible]	15⅝		25,000	[illegible]	[illegible]				[illegible] 1¼"
[illegible]	[illegible] 15 6	18⅝	21⅝	38,500	[illegible]	[illegible]				[illegible] 1½"
[illegible]	[illegible] 15	18⅝	21⅝	49,500	[illegible]	[illegible]				[illegible] 1¾"
6D	[illegible] 7 1[illegible]	19⅝	22⅝	66,000	[illegible]	[illegible]				[illegible] 1¾"
[illegible]	[illegible]	23⅝	25½	99,000	111	90	11	[illegible]		[illegible] [illegible]
[illegible]	*26	24⅞	28⅞	132,000	188	[illegible]	16	20		[illegible] [illegible]

4½" smoke, outlet, excepting 15D. which has 6" smoke outlet.
*Base plate increases height 2"

These boilers can also be supplied with top smoke outlet for 4½in. or 6in. smoke pipe. Smoke pipe and elbows should not be less than size of smoke outlet Where independent flue chimney is used, 6in. is minimum size 4½in. x 6in. cast iron adapter for making 6in. flue connection can be supplied

The New Ideal Domestic Boiler For Hot Water Supply

This New Ideal Domestic Boiler has been introduced to meet the demand for an efficient hot water supply boiler at a price rendering it eminently suitable for smaller residential work. It embodies the essential features common to all Ideal Domestic Boilers sound construction, wide water ways, closed or open fire, ease of regulation. The circular shape facilitates the removal of deposit through the ample cleanout openings. The boiler body can be supplied rustless for soft water districts Reliable and economical in operation, this new boiler will give the same satisfactory service for which all Ideal Boilers are noted, and is specially suitable for installing in kitchen

No. 00 Open Fire Domestic Boiler

Vitreous Enamel Finishes

These boilers can be supplied in vitreous enamelled finishes as follows: Mottled enamel, plain green, and dark brown

Ratings, Dimensions, etc

No	Height in Inches	Width in Inches	Length in Inches	Hot Water Supply Only			Tappings Flow and Return
				B T U pr hr	50-120	50-150	
00	22⅝	19⅝	22½	20,000	28	20	2—1¼"

4½" smoke outlet

Ideal Classic Boilers—for Hot Water Warming

The Ideal Classic marks a great advance in house-heating boilers, the design of which has hitherto precluded their use as interior appointments. As will be seen, however, the Ideal Classic Boiler is of neat appearance and also very compact occupying little floor space.

Construction. The Ideal Classic Boiler is of unique construction. It is made up of four panels, each comprising a series of small vertical waterways, which unite at the top and bottom, where the panels are joined together by hollow headers, thus forming one common waterway. The fire and ashpit are therefore enclosed within a water-jacket, the interior walls of which are fully exposed to the fire, giving a high rate of heat transmission to the water with a minimum consumption of fuel Rapid heating is facilitated by reason of the small volume of water in the boiler due to the special design of the waterways.

No. 5 Ideal Classic

(continued on next page)

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The careful use of the boiler dampers enables the fire to be maintained for several hours without attention. Alternatively the draught can be regulated automatically by means of the Ideal Damper Regulator, the small extra cost of which is soon reimbursed by the resulting economy in fuel and attention. The grate is easily kept free from clinker and ashes, the loose pan in the ashpit permitting their removal without scattering dust. Ideal Classic Boilers are made in six sizes, suitable for two to fifteen average radiators.

Finishes—Ideal Classic Boilers can be supplied with insulating jackets of galvanised steel. The regular finish for the boilers is black, but jackets and boiler platework can be supplied in vitreous enamelled finished in the following colours.—

Doors and top—Black, Jacket—Light Grey
Doors, top and jacket—Black and white mottled
Doors, top and jacket—Green or dark brown.

Ratings, Dimensions, etc.

No.	Height in Inches	Width in Inches	Length in Inches	B.T.U per Hour	Direct Radiation, Sq. Ft	External Surface B.T.U. per Hour	Tappings Flow and Return. Inches
1	25⅜	11 11/16	*18¼	22,000	150	3,300	2—1¼
2	30¼	11 11/16	*18¼	28,600	200	3,600	2—1½
3	33¾	14 13/16	*20	46,200	320	4,700	2—2
4	38 3/16	14 13/16	*20	57,200	400	5,000	2—2
5	39⅝	18⅝	†20¼	88,000	600	6,000	2—2½
6	45¼	18⅝	†20¼	114,400	800	7,000	2—2½

*Including ashtray. †Without ashtray, which is not supplied with these sizes.

IDEAL RADIATORS

Range

Ideal Neo-Classic Nos. 2, 4 and 6, Ideal Classic Nos 4, and 6, Classic Window and Classic Wall types; for residences, hotels, office buildings, etc.

Ideal Plain 1 and 2 column, Ideal Wall (plain), brass Radiator, for warehouses, factories, etc

Hospital Wide and Narrow Types.

Vento Cast Iron Heaters for heating, ventilating and drying work in conjunction with fans.

Ideal Neo-Classic Radiators

Neo-Classic No. 4

Ideal Neo-Classic Radiators mark a great advance over previous designs. The slender columns give an appearance of lightness and elegance, which makes them suitable for fixing in any situation. Their fine finish, moreover, enables them to be tastefully decorated to conform with any colour scheme. All surfaces can readily be kept free from dust by using the proper brushes obtainable.

The radiators are made up of sections according to the amount of heating surface required. The sections are assembled together by threaded tapered nipples, making perfectly watertight joints, yet permitting the free flow of water from one to the other

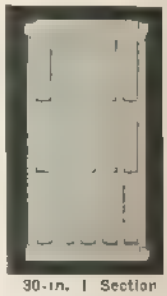
The water capacity of the Ideal Neo Classic and the Ideal Classic Radiators is one-half that of older types, so that the relations of surface to contents is doubled, heating and cooling being more quickly effected. In other words, with Ideal Classic Radiators, the temperature of the water, owing to its rapid circulation, can be readily varied to suit any climatic change

New Ideal Hospital Radiators

Wide Pattern

This latest type of radiator has been designed to meet the special requirements of hospitals, sanatoria, and other public institutions where efficiency and cleanliness are of first importance The clear space between the sections is 1⅝ins, but each section occupies only 2⅝ins in length Thus, while the surface can be very readily kept clean, less floor space is taken up than with other and older types. For operating theatres, Astro swinging fittings can be provided to permit of radiator being swung out from the wall.

Ideal Wall Radiators



30-in. 1 Section

Ideal Classic and Ideal Plain Wall Radiators can be used very advantageously wherever floor space is restricted or valuable, as the depth of section is only 2 and 2⅞ inches respectively; on an average they will effect a saving of 50 per cent. of the space required for a pipe coil of corresponding heating capacity, and their appearance is also to be preferred.

No difficulty is experienced in venting a wall radiator, as is frequently the case with long coils. Wall radiators can also be economically installed in units containing a comparatively small amount of heating surface, thus ensuring the most equable distribution of heat and maximum fuel economy, as it is possible to turn off one or more radiators when the weather conditions do not demand the full heating capacity provided

As an investment, they have a further advantage over pipe coils for industrial purposes. If at any time it is desired to remodel a building, wall radiators can be taken down and reassembled, but the cost of altering the size of a pipe coil is frequently greater than that of constructing a new one.

Vento Cast Iron Heaters

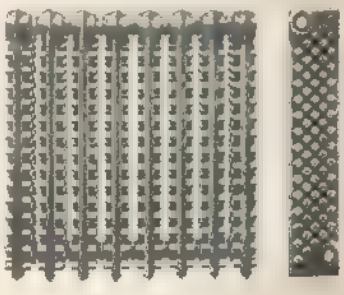
Vento Cast Iron Heaters are a great improvement on pipe coils for heating, ventilating and drying work in conjunction with fans. Their leading features are.—

Few Parts.—Section consists of three parts—main casting and two hexagon nipples. The equivalent coil consists of a base, eight risers, four nipples and eight elbows, or a total of twenty-one pieces—a difference in favour of the Vento section of 1 to 7.

Few Joints.—Section is complete with four screwed joints. The equivalent pipe coil requires twenty-four screwed joints a difference in favour of the Vento section of 1 to 6, or one-sixth as many joints

Compactness.—A Vento Heater occupies about 15 per cent. less space than the equivalent pipe coil heater—a valuable feature, especially where space is an important factor.

As will be seen from the illustration, all the surfaces are cored and therefore are of prime heating value; moreover, their construction makes it possible to obtain a perfect circulation with the sections and thoroughly break up the air currents, bringing them into close contact with the heating surfaces and thus ensuring the highest efficiency in the apparatus



Front View of Eight Section Heater

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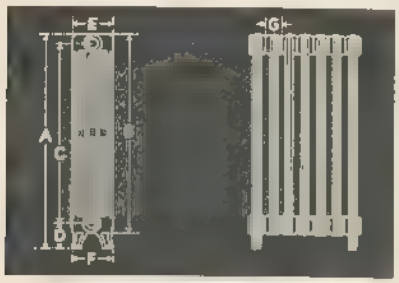
IDEAL RADIATOR DATA

Dimensions of Ideal Radiators



Adjustable Wall Brackets

If desired, Ideal Radiators can be supplied without feet and the radiators suspended by means of adjustable wall brackets

Standard Tappings

Standard tappings of Ideal Direct Radiators are plugged, and the bottom tappings bushed as under, unless otherwise specified. All radiators are supplied with ½-inch tapping for air valve on return leg section, unless otherwise ordered, with the exception of Ideal Rayrad, which is tapped ½-inch for ordinary air valve or ⅜-inch for No 21 flush type specially designed for this radiator.

Heating Surface	Hot Water	Steam
1 to 28 sq. ft	[illegible]	[illegible] x ½ inch
29 to 60 sq. ft.	1-inch	1 inch x ½-inch
61 to 100 sq. ft.	1¼ inch	1¼ inch x ¾ inch

Tappings to Vento Heaters

Unless otherwise ordered, Vento Heaters are forwarded in groups of up to 8 sections, tapped 2⅜ins. right hand at top for supply, 2⅜ins. left-hand at bottom for return, bushed to size required and assembled to 5in. centres. Both end sections of each group are topped ⅜in. for steam and vent. Both tappings should be used unless flow and return connections are at the same end

Dimensions and Ratings of Ideal Radiators

Pattern	Dimensions in Inches A	B	C	D	E	F	G	Heating per Section Sq Ft	Water Cap. per Section Lbs
Neo-Classic No 2	30	27 15/16	25 19/32	3 11/16	2 3/8	2 5/16	2	[illegible] 3	83
	24	22 1/32	19 11/16	[illegible]	2 3/8	2 1/16	2	1	57
	18	16 1/8	13 25/32	3 3/8	2 1/16	2 5/8	2	3/4	44
Neo-Classic No. 4	36	34 5/16	31 1/32	[illegible]	5 1/16	5 5/16	[illegible]	3 5	2 20
	30	28 13/32	25 19/32	3 [illegible]	5 1/8	5 1/16	[illegible]	2 3 5	1 80
	24	22 1/32	19 11/16	3 11/16	5 3/16	5 3/16	2	2	10
	18	16 1/8	13 25/32	3 11/16	5 1/16	5 3/8	2	2 5	91
Neo-Classic No. 5	36	34 5/16	31 1/32	3 [illegible]	6 1/8	6 3/8	2	5	3 90
	30	28 13/32	25 19/32	3 1/32	6 3/16	6 5/8	2 1/4	4 [illegible]	[illegible] 72
	24	22 1/32	19 11/16	3 1/16	6 1/8	6 5/8	2	3	68
	18	16 1/8	13 25/32	3 1/16	6 1/16	6 1/16	2	2 1 10	[illegible] 31
Hospital Wide	36	33 5/16	30 9/16	4	[illegible]	7 1/4	[illegible]	3 7	5 33
	30	27 5/16	24 9/16	4	7 1/4	7 1/4	2 1/8	3 1 10	5 18
	24	21 5/16	18 9/16	4	7 1/8	[illegible]	2 5/16	2 [illegible]	4 03
Hospital Narrow	36	33 5/8	30 9/16	4	5 3/4	5 1/4	2 5/8	3	4 56
	30	27 5/8	24 9/16	4	5 1/4	5 3/4	2 1/8	2 [illegible]	3 75
	24	21 5/8	18 9/16	4	5 1/4	5 3/4	2 1/16	2	2 94
	8	15 5/8	12 9/16	4	5 3/4	5 3/4	2 1/16	1 [illegible]	2 13
Classic Window	13	11 5/8	8 9/16	3	4 3/8	1 [illegible]	3	2	2 30
Classic Wall New Type	30	Each section 16 [illegible] in length						8 1/4	5 58
	24	Each section 16 [illegible] in length						6 2 2	4 84
	18	Each section 8ins. in length						5	1 74
Classic Wall	32	Each section 20 5/8ins. in length						6 [illegible]	4 10
	16	Each section 10 [illegible] in length						3 1/4	2 50
Brace	36		30 9 16	4	6 1/2	6	2 1/4	3	3 04
	30		24 9 16	4	6 1/4	6 1/2	2 1/2	2 1/2	3 30
	24		18 9 16	4	6 1/2	6 1/2	2	2	2.60
	18		12 9/16	4	6 1/2	6	2 1/8	1 1/2	2 02
Classic No. 4	36	33 5/8	30 9/16	4	5 5/8	5 1/8	2	3	3 20
	30	27 5/8	24 9 16	4	5 1/8	5 5/8	2	2 [illegible]	1 87
	24	21 5/8	18 9 16	4	5 1/8	5 5/8	3	2	1 54
	18	15 5/8	12 9 16	4	5 5/8	5 5/8	2	1 1/2	1 2.
Classic No. 6	36	33 5/8	30 9/16	4	8 5/8	8 5/8	2	4 1/2	3 30
	30	27 5/8	24 9 16	4	8 1/8	8 5/8	2	3 3/4	3 86
	24	21 5/8	18 9 16	4	8 5/8	8 5/8	2	3	2 42
	18	15 5/8	12 9 16	4	8 5/8	8 5/8	2	2 1/4	1 68
Plain 1 Column	38	35 1/4	31 9/32	4 1/2	4 1/2	5 1/2	3	3	3 35
	32	29 1/2	25 7 16	4 1/2	4 1/2	5 1/2	3	2 1/4	2 92
	28	23 1/2	19 21/32	4 1/2	4 1/2	5 1/2	3	2	2 45
	23	20 13/16	16 25 32	4 1/2	4 1/2	5 1/2	3	1 2 3	2.35
Plain 2 Column	45	42 3/8	38 15/16	4 1/2	7 3/8	8 3/8	3	5	9 3.
	38	35 3/16	31 9/32	4 1/2	7 3/8	8 3/8	3	4	7 85
	32	29 7/16	25 7/16	4 1/2	7 3/8	8 3/8	3	3 1 3	6 53
	26	23 9/16	19 21/32	4 1/2	7 3/8	8 3/8	3	2 2 3	5 10
	20	17 13/16	13 7/8	4 1/2	7 3/8	8 3/8	3	2	4 15
Vento Ideal Wall (Plain)	41	5in. centres of sections in groups of 8						10 3/4	17 60
	22	Each section 13 5/16in. in length						7 1/4	11 25
	13	Each section 21 7/8in. in length						7 1/2	11 65

IDEAL RAYRAD

The Ideal Rayrad is a modern and adaptable means of heating by low temperature radiation, the construction taking the form of a plate made in sections cast with a number of waterways, and connected together with right and left-hand threaded internal nipples. Hot water or steam circulating through these waterways warms the Rayrad throughout by conduction. The surface temperature is somewhat lower than that of the circulating fluid, which fact proves an advantage, particularly in the case of steam heating, as the unhygienic effect of dust decomposition is entirely avoided. The Ideal Rayrad can be fixed on either wall or ceiling, although obviously the principle of its operation requires that the face should be exposed as much as possible to the room interior.

The thermal rays emitted by the Ideal Rayrad are naturally much milder than those from hotter sources, but coming from a much greater area, are more effectively diffused throughout the room. In fact, the temperature of the air of a room warmed by Ideal Rayrad, taken at various heights and at various distances from the walls, does not vary more than one or two degrees, a desirable condition which no other method of heating can achieve This is because the Ideal Rayrad directly warms the air to only a relatively small extent, the convection currents from such a surface being at a practical minimum

The radiant energy (thermal rays) passes through the air in undiminished quantity, and only becomes converted to heat upon striking the fabric and occupants of the room. These in turn become heat distributors It will easily be appreciated how this differs from the action of an ordinary radiator functioning chiefly by warming the air, the temperature of which becomes higher than that of the furniture and structure of the room On the other hand, an equable condition of comfort cannot be obtained when the source of heat is at a high temperature, such as that of a fire where radiation intensity varies considerably at different parts of the room, the hot surface being necessarily of small area

As the Ideal Rayrad does not operate by directly warming the air, its effect cannot readily be judged by a thermometer, as in the case of other radiators The feeling of warmth is the same, and a person is equally or more comfortable in a room warmed by Ideal Rayrad, even though the thermometer records a lower air temperature than would be the case if the ordinary type of radiator was used

To ensure a maximum of heat being given off from the front of the Rayrad, and also on the ground of economy, it is necessary to fill in the back with slagwool or other effective non-conductor

No. 23 Rayrad

Nos. 15, 16, 21 and 23 Ideal Rayrad

These sections either have moulded edges for fixing in the face of a plastered or other wall or ceiling surface, or are made with flanged beads at the back so that the radiator as a whole can be fixed flush

(Continued on next page)

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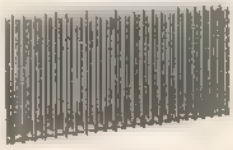
No. 24 Rayrad

The No. 24 Rayrad is designed primarily for application in window recesses although if desired it can also be fitted in the form of an enclosure quite apart from window positions.

Whilst presenting a flat front like the other types of Rayrad, the No. 24 has, in addition, considerable heating surface at the back which is free to transmit heat by convection, each section being cast with eight vertical extended waterways, as well as the top and bottom horizontal connecting waterways.

Hot water or steam circulating through these waterways warms the Rayrad throughout, the surface temperature of this type being practically that of the circulating fluid.

Front View



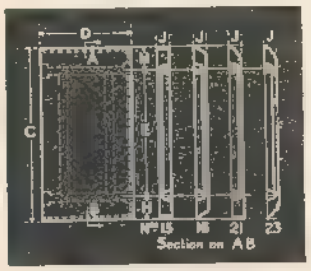
Back View

No. 24 Ideal Rayrad

The convection currents rising from the back surface of the No. 24 Rayrad have only a low velocity, and consequently keep to the lower or living environment of the room, warming the air to just that extent which enables the mild radiation given off from the front exposed surface to be fully appreciated by the occupants of the room. This combination of heat transfer by radiation and convection is so balanced that the heating effect is very satisfactory. Fresh air can be introduced to the back surface, but in many cases it may only be desired that the air in the room is recirculated.

To avoid unnecessary heat loss through the wall to the outside air, it is recommended that the wall immediately behind the No. 24 Rayrad be covered with a sheet of cellular asbestos or similar insulating material and, together with the back of the radiator, be given two coats of aluminium or other metallic paint. Thus the radiation from the back of the radiator, and also the absorption of radiation by the wall is reduced to a minimum.

DIMENSIONS



Nos. 15, 16, 21 and 23 Rayrad

Total height	30	24	18	C ins.
Surface per section	9	7.5	6	sq. ft.
Width of section	16	16	16	D ins.
Centre to centre of tappings	22	18	12	E ins.
Distance from edge to centre of tappings	4	3	3	H ins.
Depth of section	2½	2½	2½	J ins.

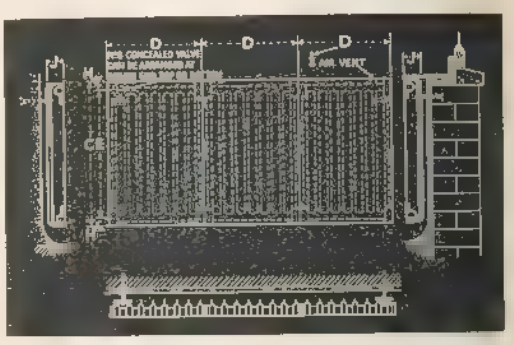
End strips 5 ins. wide are regularly supplied for Nos. 21 and 23 Ideal Rayrad to complete the moulding, and conceal pipe connections up to and including ¾ inch. When back connections are used narrower strips, 2½ ins. wide, can be furnished.

FIXING

Nos. 15, 16, 21 and 23 are fixed by means of rag bolts and cast iron [illegible] which are tapped both top and bottom for screwing the Rayrad sections, which are supplied with standard drillings to suit. No. 24 is fixed by means of short pins, which pass through drilled holes in the extended surface at back and rest upon adjustable wall brackets. Metallic paints should not be used for decoration.

NIPPLES—TAPPING

Ideal Rayrad Sections are connected together with 1 inch right-hand and left hand threaded internal nipples. They are dispatched assembled up to 8 sections in length unless otherwise ordered. Size of tappings, 1-inch.



No. 24 Rayrad

Total height	[illegible]
16-inch section	[illegible]
Surface per section	[illegible]
8 inch section—width	[illegible] ins.
Surface per section	[illegible]
Centre to centre of tappings	[illegible]
Distance from edge to centre of tappings	[illegible]
Depth of section	[illegible] ins.

ACCESSORIES

Ideal Radiator Valves

No. 381 with Union

Nickel-plated angle and straight radiator valves with unions and Bakelite handles.

Sizes ½ to 1¼in.

No. 311 with Union

Union Elbows

Sizes—½ to 1¼in., nickel plated, union elbows

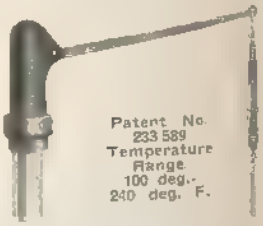
Radiator Air Valves

Left—No. 41, nickel-plated keyless radiator air valves

Right—No. 43, nickel-plated, with Bakelite handle

No. 802 Ideal Damper Regulator—For Heating and Hot Water Supply Boiler

This regulator is made entirely of metal and has no perishable parts. The bulb contains a metallic bellows surrounded by a liquid capable of regular expansion and contraction in accordance with the temperature of the water. Attached to the bellows is a stem passing through a spiral spring and forked to support the lever rod, which is held in position by a pin, the tension of the spring keeping it raised, and consequently the draught door open, by means of the chain. As the temperature rises the liquid expands and compresses the bellows operating against the spring and forcing the stem upwards, thus allowing the lever to fall and the draught door to close. The action is reversed as the water cools. (Descriptive pamphlet sent on request).



Adjustable Floor Plates

These adjustable hinged plates can be fitted after work is completed, the plates being held in position by means of a screw. They are obtained in black or plated [illegible] for pipe diameters of [illegible], ¾in., 1in., 1¼in., [illegible] and 4in.

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

"ATHENA"
Trade Mark

A. E. ATHERTON & SONS PTY. LTD.

383 LATROBE STREET, MELBOURNE, VICTORIA

Complete Heating and Ventilating Equipment and Installations

30*d*

S.A.A. File No.

[For Other Products, See Index]

COMPLETE HEATING AND VENTILATING INSTALLATION CONTRACTS

A. E. Atherton & Sons Pty. Ltd., having been for many years associated with the installation of varying types of heating and ventilating equipment, have gained a thorough and comprehensive conception of the work involved and, through this experience, they are in a position to undertake all phases of work required in the installation of the complete equipment of any ventilating, air conditioning, or heating system.

A special branch of the work that this firm is prepared to undertake is that of the construction and installation of ventilating duct work. This requires a detailed knowledge of all the work involved in the construction of graduations in changes of section and direction, which all form an important part in the true functioning of the system. All this construction is carried out according to specifications by skilled men under careful supervision.

If required, A. E. Atherton & Sons Pty. Ltd. are prepared to offer advice and suggestions in the preparation of the design of any heating or ventilating installation.

THE "ATHENA" UNIT HEATER

The "Athena" System of Unit Heating

The underlying principle of "Athena" unit heating is to deliver, without waste, a large supply of evenly distributed heat by air movement. This is accomplished by suspending unit heaters at desired locations on the hot water or steam supply lines, from whence heated air is discharged down to the floor and circulated throughout the entire working area. The heated air then rises and, as it reaches the level of the heaters, it is drawn in by the fans and again discharged downwards.

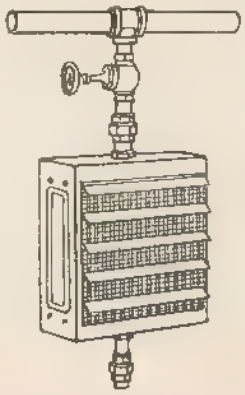
A constant circulation of warmed air is thus maintained and, owing to the method of recirculation, very little heat has the opportunity of escaping from the working area and being wasted at the ceiling.

This principle of unit heating is adaptable to all classes of industrial buildings. It is also of great assistance in accelerating drying operations in various plants.

Construction of the Heater

All the good qualities of high-grade materials and thorough workmanship are embodied in the construction of the "Athena" unit heater. Briefly it consists of a copper condenser mounted in a strongly constructed supporting frame, upon which the fan and motor assembly is supported. The condenser, consisting of seamless copper tubes with copper fins tinned on, baffles the air as it passes through and causes it to come in contact with the heat giving surfaces. The heated air is deflected down by the adjustable louvres at the front of the unit.

The unit is constructed in a range of models suitable for covering the requirements of the replacement of 1,390 sq. ft. of cast-iron radiation and delivery of 3,500 cub. ft. of air per minute, down 144 sq. ft., and 300 cub. ft. per minute respectively.



Thermostatic Control

Automatic temperature control may be secured by placing a thermostat in the electrical circuit which supplies the motor of the heater. This control will maintain any desired room temperature.

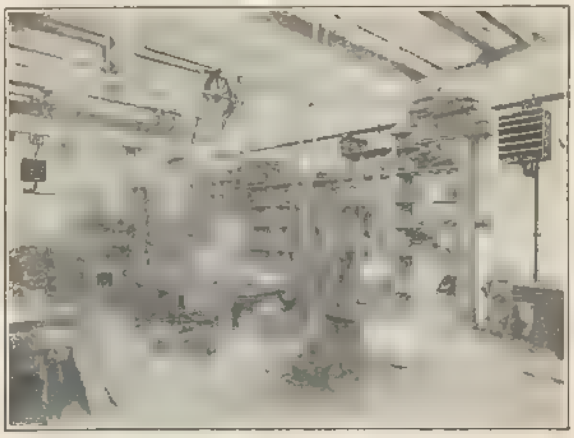
Advantages

The main advantage of the "Athena" system of unit heating over cast-iron radiators and similar types of radiation is that of heat economy and wider distribution. Warmed air travels upwards, with a consequent gathering at the ceiling where it is not wanted. It thus follows that a large amount of heat must be produced in order to warm the working areas below evenly and thoroughly. This method—slow and expensive—is not to be compared with quick, direct and consistent distribution of heat provided by the "Athena" system of unit heating.

Due to their large heating capacity, comparatively small size and ease of installation, "Athena" unit heaters ensure lower operation and installation costs than their equal in cast iron radiation.

Installation

The "Athena" unit heater is simply installed, as it is sent out completely assembled ready for suspension from the supply main. After the main supply and return have been run, the installation consists only of making up unions at the supply and the return from the heater, and making the electrical connection.



"Athena" Unit Heater installation in a Melbourne Machine Shop. A uniform distribution of heat always under control.

(Continued on next page)

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"ATHENA" COMPRESSION FITTING

Uses of Fitting

The "Athena" Compression Fitting manufactured in high-grade gunmetal for making joints in steam hot water and all engineers' brassware

Making the Joint

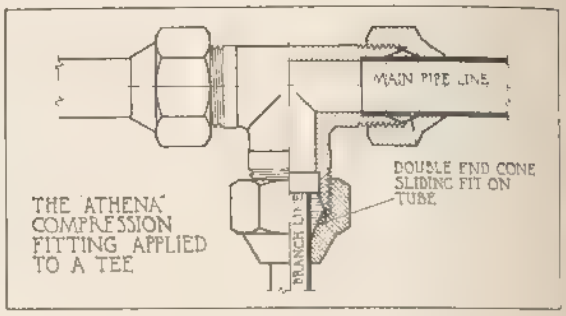
To make a joint with the compression fitting is very simple. The nut or female end of fitting is slipped over tube and the loose double end cone fitted to tube as shown in drawing. The nut is then screwed up outside the male end of fitting, making a perfect water and steam-tight joint.

The only tool required for making this joint is the wrench used to screw up the nut, thus speeding up and simplifying pipe work considerably; as there is no screwing or brazing to be done, a lighter gauge tube may be used throughout the system

LIST OF FITTINGS AND SIZES

The following can be supplied with compression flanges in sizes to suit ¼ in. to 3 in. diameter tubes

M & F Union Elbow, Breeching Piece, Union Tee. For tubes over 3 in. diameter a special flanged fitting is supplied.



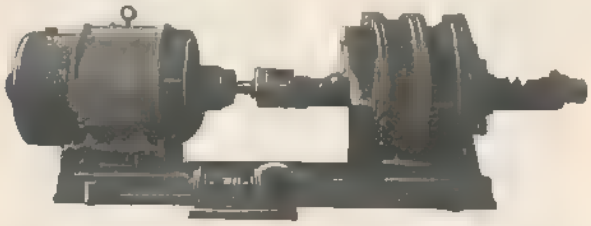
The "Athena" Compression Fitting applied for reducing from main pipe line to a branch supply

CENTRIFUGAL PUMPS

Products

Rigid standards of quality and sound engineering is employed in the manufacture of our centrifugal pumps.

We manufacture both horizontal (single and multi stage) and vertical or submerged type, the latter for pumping out sumps, pits, etc.



A CONTRAST IN PUMPS

The illustration shows a 8-in. multi-stage centrifugal pump used for re-circulation in the air-conditioning plant at the Melbourne Town Hall and capable of delivering 12,000 gals. per hour against a 60 ft. head Motor is a 10 H.P. operating at 600 R.P.M

The small unit in front is a ½-in. single-stage pump, used for an accelerated Hot Water heating job It delivers 5 gals. per min. against a 5 ft. head Motor is a 1/16 H.P operating at 1,400 R.P.M

Features of Construction

Ring oil bearing, ball bearing thrust, stainless steel shaft, long packing glands. The construction of the trunnion allows the discharge outlet to be placed at any desired angle. Casing cover and bedplate of cast iron, machined where required All rotating parts balanced.

Power Application

Direct driven through flexible coupling, with electric motor

Types

Single stage pumps to multi stage. Pumps suitable for low, medium, high pressure work.

Sizes and Capacities

¾ in.—4 in. single stage, 10 gals. to 200 gals. per minute.

1½ in.—3 in. multi stage, 50 to 200 gals. per minute.

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"GARNAY"

GARDNER & NAYLOR PTY. LTD.

Domestic Engineers

HEAD OFFICE AND WORKS:
304-8 SPENCER STREET, MELBOURNE, C.1
TELEPHONES: F 3679-F 3670

29*d*

S.A.A. File No.

WATER HEATERS AND BOILERS

Boilers and equipment manufactured by Gardner and Naylor Pty. Ltd are based on many years of practical experience; the improvements which are built into them as they are proved, and their strong and faithful construction, placing them in the highest grade.

Materials used in the construction are specially chosen for strength and durability and suitability for the purpose required, each unit being tested before leaving the works and carrying the firm's guarantee.

Dimensions: 4ft. 6in. high, 11in. dia.

The "Garnay" Domestic Briquette Boiler

This Boiler has been designed in conjunction with the Briquette Engineers of the State Electricity Commission to provide an efficient and economical briquette hot water service for the small home

Though it is low in price, quality has not been sacrificed, and this heater can be thoroughly recommended. The combustion chamber is constructed of heavy acid-resisting copper and the base of cast iron.

One of its important features is its remarkable economy, low in first cost, low in running costs, and for the service it performs it is the most economical of its type. A few briquettes will be sufficient to keep it operating under normal conditions.

Though it has only recently been introduced, the "Garnay Domestic" has definitely proved itself.

"Garnay" Electric Water Heater

This fitting, which conforms to the high standard of other Gardner & Naylor products, has a special claim owing to its high all-round efficiency, especially as regards the electric element and insulation.

The element the heart of the service—is a special heavy duty type.

The heater is made in standard sizes from 40 to 100 gallons. Larger sizes or special arrangements to supply commercial processes can be provided

Features to be noted are the specially heavy insulation and the circulation arrangements which ensure that the hottest water available will be drawn off.

Optional fittings comprise Thermostatic Control and a Booster. "Garnay" Electric Heaters are designed to operate under the new "Night Load" rates of supply and running costs may be definitely ascertained and guaranteed before installation

Literature

Illustrated leaflets will be sent on request to Architects and Engineers, giving fuller particulars of these Boilers

The "Victor"

This Boiler has been installed in hundreds of homes throughout Australia.

It is a combined boiler and storage unit, the flue being carried through the storage. This construction ensures efficiency and economy and reduces the cost of manufacture and installation

Special rocking and tilting bars are fitted to obviate the necessity for raking and poking.

The "Victor" burns briquettes, coke, wood or dry household refuse

It is solidly constructed of heavy gauge acid-resisting copper. Compact and neat in appearance, it may be placed in kitchen, laundry, verandah, etc. Stands on a 9-inch brick base

Dimension Height, 5ft.; 40-gallon size, 21in. diameter, 50-gallon, 22in., and 60-gallon, 23 in diameter.

"Victor" Combination Boiler

The "Boska"

The "Boska" is designed for larger capacities than the "Victor," and is used in conjunction with a storage cylinder or tank

It burns briquettes, coke, wood or dry household refuse Rocking and tilting bars are fitted as standard. The "Boska" is solidly constructed of heavy gauge acid-resisting copper

"Boska" Boiler.

Dimensions

Cylinder or Tank Capacity, gallons	Diameter (inches)	Height (inches)
60	15	30
100	18	33
150	22	41
250	22	45

Recommendation

The Victor, Garnay Domestic and Boska have been approved by the State Electricity Commission of Victoria for burning briquettes.

(Continued on next page)

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GAS, AND OTHER BOILERS

"Invincible" Automatic Boiler

This is a thermostatically regulated combined boiler and hot water storage unit for gas operation, and is essentially a copper water jacket surrounding the combustion chamber of the boiler and a series of coils connecting across the centre in the path of the flue gases. The boiler is insulated with three thicknesses of hair felt and is cased neatly with galvanized sheet iron and finished in grey enamel, while the burner base and all mountings are nickel plated.

"Invincible" Automatic Gas Boiler.

The "Invincible" is quite automatic, as the gas supply is controlled by a thermostat, which keeps the water at just the temperature desired.

A pilot flame burns the whole time that the gas is on, so that the boiler may be left on all day with perfect safety, and will literally take care of itself.

DIMENSIONS

Capacity	Height	
2 gallon	24in.	8in. x 8in
6 "	2ft. 6in.	10½ in diameter
10 "	3ft.	16½ in.
15 "	3ft. 8in	16½ in
20 "	4ft. 0½in.	16½ in
25 "	4ft. 5in.	16½ in

"Invincible" Gas Circulator

This is an Automatic Gas Boiler designed to heat separate hot water storage cylinders and tanks for hot water services, etc.

It is often used for assisting hot water systems by working supplementary to another heating unit. It always requires some form of separate hot water storage.

Dimensions—12 in. diameter by 2 ft. 2 in. high.

Indirect Hot Water Systems

In hard water districts, it has been found that a lime deposit readily forms on the interior of the boiler, which reduces the efficiency tremendously, and in most cases ruins the boiler.

The difficulty is overcome by adopting the indirect system in which the boiler is not openly connected to the hot water supply system and is thus protected from harmful deposits.

Steam Calorifiers

When a supply of steam is available, calorifiers are the most efficient means of heating water. They are entirely automatic in operation, a thermostat controlling the steam supply in accordance with the hot water demand.

High Water Pressure Calorifiers.—This type is for water pressures up to 120 lbs. per sq. in., and consists of a copper-lined mild steel shell. On the end plate a cast-iron steam chest is bolted, having steam and exhaust connections. Solid drawn copper U tubes are expanded into the end-plate and covered by the steam chest.

Low Water Pressure Calorifiers.—For water pressures up to 40 lbs. per sq. in. the calorifier consists of a copper cylinder with a heating coil of heavy gauge copper tube.

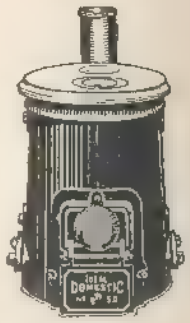
Service to Architects

We are always pleased to supply measurements, capacities, details of construction and layout for all types of services. When plans are in the preliminary stage such information may be of considerable assistance.

Cast Iron Water Boilers

These boilers are of heavy cast iron construction, each casting being subjected to special tests. The boiler is fitted on a solid cast-iron base. Dampers, which may be fitted with automatic regulators if required, are provided for controlling the fire. Fuel used is briquettes, wood or oil.

For Melbourne and surrounding districts, boilers which have been treated by a rustless process are supplied in order to [illegible] the mineral and vegetable acids contained in solution in the water supply, which would tend to discolour the water in a plain cast iron boiler. In some outlying districts, plain cast-iron boilers are suitable and can be supplied.



Cast-Iron Domestic Boiler.

Installation

Proper installation is vital for the successful operation of hot water service.

Our long experience—over 25 years—enables us to safeguard every detail. We both manufacture and instal these services, and can therefore unhesitatingly guarantee every installation we carry out.

Features of the Gardner & Naylor distribution system are as follows:

PIPE SIZES are designed and proportioned to supply the requirements of the system and arranged to suit any treatment, feature or layout required by the architect.

PIPE FITTINGS are of brazing metal and all joints are brazed.

INSULATION.—Hot water pipes are efficiently insulated, especially in gas and electric systems, where insulation receives more than usual attention, owing to higher running costs.

CIRCULATION SYSTEMS.—Where the fittings to be supplied are widespread, it is usually found advisable to adopt a circulation system with which hot water is made available more promptly at the distant fittings.

Circulation systems, however, are not usually recommended in gas and electric systems, unless running costs are of no consideration. In these systems, it is possible to install the units in a position central to the fittings.

COLD SUPPLY TANKS are of copper or galvanized rustless steel, with safe under and overflow waste pipe for protection of ceilings.

FLUES. Flue pipes from boilers are of heavy gauge steel, and have ample provision for cleaning.

FITTINGS.—Taps and fittings used in Gardner and Naylor installations are of the best type, heavily nickel-plated.

The following are optional fittings:—

N.P. hot and cold combination shower fittings, shower needle sprays, shower mixing valves, combination hot and cold swivel fittings for baths and sinks, towel airers and rails, N.P. sink standards, shampoo fittings, heaters for linen cupboards.

FIRE UNDERWRITERS.—Gardner and Naylor installations conform to the requirements of the Fire Underwriters' Association.

GUARANTEE.—Each Gardner and Naylor installation is guaranteed for efficient and proper operation.

Oil Burning Equipment

Hot water boilers may be fired by oil fuel, the running costs being approximately the same as for coke or briquette firing. Oil is usually stored in an under-ground tank filled by means of an oil fill line directly from the oil company's waggon, and provided with a level indicator; the whole system complying with the requirements of the Fire Underwriters and not affecting house insurance.

Practically no attention is required, a thermostat controlling the burner. A safety stack switch is provided.

COMPARISON OF DIFFERENT TYPES OF HOT WATER SYSTEMS

The cheapest to operate is the system using briquette or coke fuel, and it gives excellent results.

Gas systems are higher in running costs, but are convenient and efficient; our systems being arranged with gas and water automatically controlled require no attention.

Electric systems are very convenient. When operating under special "Continuous" or "Night Load" Tariffs and when the demands of [illegible] are [illegible] they are both [illegible] and efficient. Steam systems are [illegible] where steam is available.

WHATEVER THE TYPE OF SYSTEM WE CAN SUPPLY IT.

Of the several heating agents available each has its merits according to location, suitability, convenience and adaptability for [illegible] working. We manufacture equipment for all these systems and, as we have no bias or agency for any particular one, we are able from our wide experience to advise the best system to suit the conditions.

(Continued on next page)

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HEATING INSTALLATIONS

GENERATION

Heating Boilers

There are a number of types of Boilers available, for direct heating or panel heating, i.e., where the heating unit is exposed in the room, hot water heating boilers are used; where a combined heating and ventilation or unit heater system is required, steam is the medium usually selected

Cast-Iron Boilers

These boilers are usually composed of a number of independent sections connected so that the group will operate as one unit

Advantages:

1. Low in cost

2. Flexibility—extra sections may be added should the load be increased.

3. Ease of handling—can be taken through doorways and openings large enough to take one section.

These boilers are designed for efficiency and economy, efficiency is aided by the long flue travel of the gases and efficient heating surfaces; economy is secured by dampers on flue and ash pit doors. When the cold water supply is more than 120 feet above the boiler it is usual to instal steel boilers.

Steel Boilers of the Colonial Underfired and other types. These boilers are also selected for large installations (which would require more than one sectional boiler) in order that only one boiler would be required This would mean a saving in floor space, and also, if oil fired, would save the extra oil burner

Cast-Iron Sectional Heating and Steam Boilers fired by Oil Burners. Hot Water Supply Calorifiers at Ceiling (right).

Central Heating for Homes

The comfort and convenience of Central Heating in homes is becoming more widely appreciated. Gardner & Naylor have carried out many installations which have given every satisfaction

The heating unit may be operated by briquette, wood, coke or oil fuel Oil burning systems have been most successful, and they possess outstanding advantages

The temperature of each room may be controlled as required

COLONIAL TYPE—

These usually require to be set in brickwork The Boiler may be the single return type in which the gases pass from the tubes into the smoke-box and flue, which is situated at the firing end of the Boiler, or the double return type in which the boiler gases return through another set of tubes to the smoke-box at the back of the Boiler

DISTRIBUTION

Panel Heating

The installation of Panel Heating in the new A.M.P Building, Melbourne, has aroused interest in this new principle which, though new to Australia, has a wide vogue overseas.

In the A.M.P. installation we adapted our own patented improvements. The principle of Panel Heating is based in theory on the warmth of the radiant heat of the sun. Heat moving in straight lines from its source and not heating the air in transit can keep the human body warm and comfortable at a much lower temperature than with warmed air, as in radiator systems.

This radiant heat is effected by fitting into the ceilings steel pipes of a special formula, bent, welded and laid on the top of the forms, and cast into the concrete plate

By our own patented process, any linear expansion of these coils is taken up, without harm to the plaster or the concrete plate itself.

It naturally follows that though installation costs are about the same as radiator systems, operating costs are almost half owing to the lower temperature at which this system of heating is effective.

This type of work requires more skill on the part of the actual workmen, and we have, by experiment and training, developed methods and staff to safeguard the efficiency and quality of this work.

Further particulars will be gladly supplied to those interested.

Partitions Anywhere with Panel Heating.

(Continued on next page)

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

DISTRIBUTION—(*continued*)

Circulation Pipe Systems

These may be either a gravity (or natural) circulating system, which is usually best for small installations, or pump accelerated systems which are best suited for larger installations

Copper Fin Heaters

"Garnay" Heaters are made up of units of standard sizes. Each unit consists of a series of copper tubes connected between flow and return headers, on which copper elements are fitted. The whole unit is tinned and is supplied in casing ready for connection to ducts and pipes.

The number of units required, and their arrangement in the heater, are dependent on the quantity, velocity and temperature of air to be heated.

These have practically replaced the heavier and bulkier cast iron types, and have been used successfully in combined heating and ventilating systems in City Buildings, Theatres, Hospitals, Factories, Drying Rooms, etc. We claim that a "Garnay" heater easily carried by one man will effectively perform the work previously done by a cast iron heating battery weighing half-a-ton.

These heaters are suitable for use with steam or hot water.

Drying Rooms

The heating requirements of drying rooms depend on variable factors, such as time required, temperature limits, method of handling, and heating medium available. They are specially suitable in chemical and soap factories, hosiery mills, laundries, potteries, woollen mills, paint shops, timber and cabinet works, tanneries, boot factories, club dressing rooms, etc.

Gardner & Naylor, from a wide experience, are in a position to design the arrangement best suited for any particular case.

The articles to be dried may be arranged on trolleys, wire belts, gratings, horses, hooks, clips, etc., etc., and drying is effected by air change and heat from pipes, radiators, batteries, using hot water, steam, gas or electric heat. Fuel stoves are also used

"Garnay" Unit Heater

RADIATORS

The **"RAY RAD"** Cast-Iron Radiators, designed to produce similar effects to the panel system, have been developed for fitting on ceilings and walls, and are now widely used in Great Britain. These require skill and understanding to make an effective and trouble-free installation.

Cast-Iron Sectional Radiators

Cast iron Sectional Radiators are the most popular form of heating units. Modern radiators have slender columns and mountings, valves, etc., are nickel-plated—a considerable improvement in appearance over old types.

Radiators may be placed in recesses, or with architectural pattern registers in cabinets.

The sizes of radiators required are estimated in accordance with the heating conditions both inside the rooms and outdoors

The cost of installation may be minimised by utilising a compact layout and positions should be selected with that purpose in view.

Modern Type of Cast-Iron Sectional Radiator

Heating Stoves

Cast iron slow combustion stoves are suitable for heating small factories. These stoves are operated by briquettes or coke, and are inexpensive to instal. They are usually placed in a central position and a flue carried to the ceiling. Dimensions: 18 in. x 14 in. x 34 in. high.

Gas Heating Systems

Are suitable for heating areas of moderate size. They are also used in small drying rooms for factories, etc.

Electric Heating

Is used for specialised processes where automatic and accurate temperature control is essential.

Factory Heating—"Garnay" Unit Heater

For Factories where large spaces are to be heated and the space is not divided up by partitions, the "Garnay" Unit Heater provides the ideal heating system.

The importance of Factory heating cannot be too strongly emphasised

Machines work far more efficiently under even conditions of temperature; there are fewer breakages, lubrication troubles are minimised.

Even temperature means more comfort to operatives. The "Garnay" Unit Heater not only keeps the temperature higher than outdoors on cold days, but gives a feeling of comfort by circulating air in hot weather.

The "Garnay" Unit Heater illustrated consists of a finned copper heating element enclosed in a neatly finished steel frame. Air is blown through the heating element by an electric fan mounted on one side of casing by means of radial steel arms. The air flow is directed by adjustable louvres mounted on the opposite side of frame to motor. This system heats quickly and gives a positive circulation of heated air at working level.

Dimensions

Standard—31 in x 25 in. x 18 in. deep.
Junior—26 in. x 20 in. x 18 in. deep.

The heating capacity of these units is dependent on steam pressure or water temperature.

Send for descriptive matter.

(Continued on next page)

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MECHANICAL VENTILATION

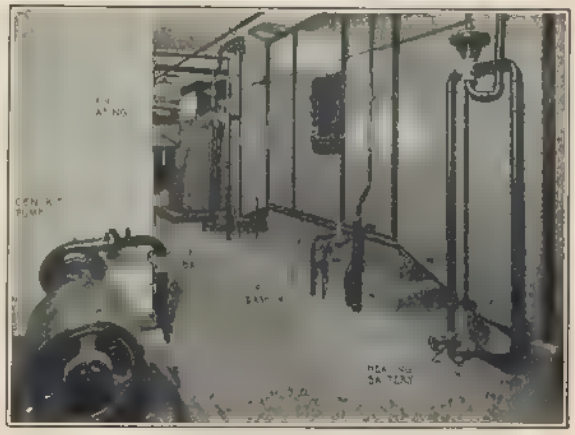
Adequate ventilation is of ever-increasing importance, as the standards of comfort and health are now more exacting than ever before.

Gardner & Naylor Pty. Ltd. installations include shops, showrooms, basements, public buildings, hospitals, kitchens, residences, etc.

The principal advantages of mechanical ventilation are: (a) positive circulation of air (at desired temperature if necessary) to all parts of the building, (b) practical uniformity of ventilation regardless of atmospheric conditions

Points to which Gardner & Naylor Pty. Ltd. have paid special attention are:

Quiet operation of both the fan and motor units, ducts adequately supported, firmly fixed and designed so that the least possible resistance is offered to air movement, systems balanced and controls arranged to give free flow and even distribution of air to all outlets. Initial cost can be saved by using high-speed fans and motors, but the noise from such fittings can become a costly nuisance. Ample duct capacity is also arranged to save noisy air velocities.



"Garnay" Air Conditioning Plant.

Description of Systems

Ventilation actually consists of the displacement of vitiated air from an apartment and its replacement by fresh air This is done in a mechanical way, by either a Plenum (blow in) system, which is used in cases where it is desired to treat the air by heating, air conditioning, etc., or an Exhaust system, in which the principal impurities that demand attention are dust, bacteria and odours, or, better still, by a combination of both.

Plenum

With this system the main air inlet is placed as high in the building as possible, preferably at or above the roof level. To further purify the air coming in it is often passed through an air washer or an air filter.

The movement of the air is maintained by means of various types of fans, usually of the multivane centrifugal type, which force the pure air through the system.

In cases where it is desired to treat the air in any way, either by heating or air conditioning, the Plenum system is usually adopted

Exhaust System

Where the vitiated air requires almost immediate removal, such as in lavatories, hotel kitchens, chemical works, etc., Exhaust systems are used. The vitiated air is collected by hoods or registers placed in suitable positions and the air is forced to the external atmosphere by a fan

It is of great importance that the vitiated air be exhausted in such a way that it cannot find its way into the building again through any plenum inlets and that it will not be a nuisance to surrounding buildings.

Combined Plenum and Exhaust

Where a positive air movement is essential, and for large installations the combined plenum and exhaust system is usually adopted

By this system a positive circulation of air is set up, thus causing a continuous flushing of the apartment

Combined Heating and Ventilating

No system will warm a building more quickly or more effectively than a combined heating and ventilating system. This is a distinct advantage in many cases, especially where the building is allowed to cool down overnight

This system is suitable from a heating point of view for rooms or halls of great height where the radiation or panel heating systems are not so suitable. An advantage of this system is that a uniform temperature is obtained

The air is heated by means of a heating battery placed at some convenient point in the main air duct. The battery is heated from a steam or hot water boiler.

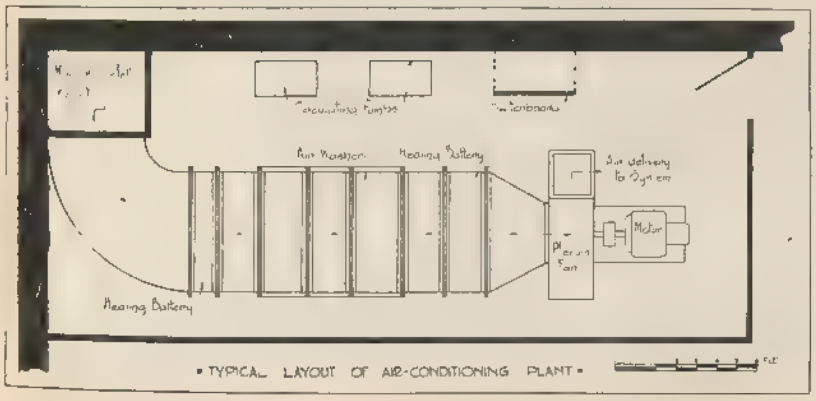
"Garnay" Copper-fin Heating Batteries are specially suited for this work and have been used in many large heating systems.

Air Washers

Air Washers are generally used in conjunction with ventilating systems for public buildings, hospitals, offices, etc., where it is imperative that the air supply is pure.

The "Garnay" standard air washer consists of a spray chamber in which the air is cleansed of its dust by passing through a fine misty spray obtained from a large number of uniformly spaced centrifugal nozzles.

A motor-driven centrifugal pump supplies the water, after passing through a strainer, to the nozzles at high pressure. From the spray chamber the air passes through a series of scrubber or eliminator plates, which remove any remaining dust, and finally remove any free moisture in suspension which has been carried from the spray chamber They are continually flushed by a stream of water which removes collected dust particles. A settling tank for the spray water completes the air washer



• TYPICAL LAYOUT OF AIR-CONDITIONING PLANT •

Air Filters

Air Filters differ from Air Washers in that they are designed to purify the air but not to treat it in any other way. An air filter consists of a number of units which contain a series of oil film covered baffles for filtering the dust particles in the air stream.

The units, which are removable, are regularly spaced in a framework consistent in area with the permissible air velocity. It is possible to remove 98 per cent. of the dust particles by this method.

The filter requires periodical cleaning and is so designed that cleaning is easily and quickly accomplished without interruption of the system

(Continued on next page)

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Air Conditioning or Manufactured Weather

Air conditioning takes into consideration the following variable factors—Temperature, Relative Humidity, Purity and Air Motion.

It is the science of treating the air in order to obtain a required condition of air independent of atmospheric conditions.

The desired conditions are obtained by means of air washers, air filters, humidifiers and some form of heating battery.

Air conditioning, as well as being desirable from the standpoint of health and comfort of humans, is applicable and often essential in many manufacturing operations.

Rates of production have been made uniform, production efficiency has been increased and the quality of the product has been improved by air conditioning installations. In textile mills, printing, baking, flour-milling, air conditioning has a special application.

By means of automatic control devices, it is possible to obtain a desired condition of the air and maintain it quite automatically to a very fine degree.

Humidity and Humidity Control

In many manufacturing processes humidity or moisture content of the air must be maintained at a certain standard. An efficient humidity control system is provided by means of humidifiers and air washers, which can be automatically controlled by humidistats or other devices to maintain the relative humidity at the required standard.

Duct Work

In order that each outlet may have its right share of air at the correct velocity the designing and accurate proportioning of ducts is of considerable importance.

Where quiet operation is desired the velocity of air in the ducts is fairly low. In ducts of larger proportions special means are taken to prevent sagging or rattling under the heavy pressure.

In new buildings it is usually possible to form main ventilating shafts in the building construction while branch ducts of galvanised sheet iron can often be covered by some plaster treatment so that all ducts are concealed.

Our many years' experience in installing heating and ventilation systems assures that the components of all our installations are adequate and efficient for the operation to be performed.

Dust and Fume Removal Systems

These systems require ducts, etc., of a heavier type than in ventilating systems. High Pressure Fans which are able to give greater suction are used.

Collecting hoods are designed according to requirements, they are usually placed over the apparatus from which the fumes arise, and where necessary special hoods are used with greater suction at the edges.

Dust separators to Gardner & Naylor standard of heavy construction and high efficiency are provided for separating the dust from the air stream.

Conveying Systems using a dust type fan and a series of ducts are often suitable for conveying light materials from place to place.

Indirect Systems

In circumstances where the fumes are highly inflammable it is necessary to use an indirect system in which the fumes do not pass through the fan where a spark might ignite them.

This is done effectively by means of the syphon or evasé tube method.

Service to Architects

Gardner & Naylor are always pleased to advise the ventilating system or systems best suited for any set of conditions and to plan the necessary ducts and fan room, etc., so that they may be included in the constructional plans or allowed for in the general design.

SEWAGE DISPOSAL

Gardner & Naylor Pty. Ltd. Sewage Disposal Systems are the result of over 25 years' experience. These systems can be designed to suit practically any set of conditions. Consideration must be given to local conditions, available water supply, the suitability of site for disposal of effluent, nature of soil, the requirements of local authorities, proximity to source of water supply, etc.

Bacteriolytic or Septic Tank

The G. & N. Septic Tank is designed to bring about the decomposition and consequent purification of sewage by a biological process.

The construction of the tank is either in brick work or concrete, made thoroughly waterproof with cement rendered interior; the arched top being reinforced. All stoneware pipe connections and fittings in the tank are provided with inspection openings, easily accessible for cleaning purposes. Manholes are fitted in the top for inspection and cleaning.

Various stages in the decomposition of sewage matter are associated with different forms of bacteria, which work in fairly regular succession. Chambers are provided in G. & N. septic tanks which provide the nec[illegible] for the propagation and operation of the v[illegible] is efficiently vented either through the drains or separately, to supply the necessary oxygen which is essential to the operation of the tank.

In some cases, an aerobic filtration chamber is fitted to the tank, in order to produce an entirely clear effluent. This, however, requires periodical attention.

Disposal of Effluent

In sandy, loamy or porous soil the effluent may be disposed of below the surface of the ground by a subsoil irrigation distribution system. Care is observed, so that the system is free to distribute as evenly as possible over the whole area, and precautions are taken to prevent earth from getting into the lines and causing a blockage. When it is necessary to carry the effluent long distances or to a higher level an automatically operated pump is used.

Aerobic Filtration System

In some cases it is desirable or necessary to further oxidise the effluent. This is done in an aerobic filtration system.

The filter media must be of ample capacity and so arranged that it may be easily cleaned. The effluent is automatically and evenly distributed by a special form of trough, ensuring the efficient operation of the full area of the filter bed.

Careful design and periodical cleaning are essential to the proper working of an aerobic filtration system. If badly designed or neglected, it can readily become a menace.

Disposal of Wastes

While it is best, in our experience, to separate the house waste from the sanitary system, in larger works they can be combined under suitable arrangements.

The wastes from bathroom, kitchen, laundry, etc., are disposed in a similar manner to the effluent from the septic tank. Before being passed into the subsoil distribution system, the wastes are treated in a detritus chamber constructed of brick or concrete.

Installation, Drains, etc.

The necessary drainage lines and the system of venting have also an important bearing on the successful operation of the installation.

The staff carrying out these installations is thoroughly experienced in every phase of the work, having been in the firm's employ for a number of years.

General Plumbing Services

Gardner & Naylor are in a position to economically carry out the whole of the plumbing services incidental to any country residence or building. This includes the supply and installation of all the sanitary and toilet fittings, with their necessary waste and water supply connections.

Complete water supply and storage schemes, using engine or motor driven pumps, hydraulic rams, dams or windmills, are designed according to the source of water supply available and the conditions operating.

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S E C

STATE ELECTRICITY COMMISSION OF VICTORIA

Head Office:
22 WILLIAM STREET, MELBOURNE
Tel. C.8292 and C.9447

Power Stations:
YALLOURN — NEWPORT — RICHMOND AND GEELONG
SUGARLOAF - RUBICON (Hydro Stations)

District Undertakings: Tel.
CASTLEMAINE DIST.: Castlemaine - 238
EASTERN METRO. DIST.: Dandenong 182
GEELONG ELEC. SUPPLY: Geelong 1941
GIPPSLAND DIST.: Traralgon - - - - 114
METRO. ELECTRIC SUPPLY: Cent. 10310
NORTH EASTERN DIST.: Benalla - - 276
WESTERN DIST.: Colac - - - - - - - 246

29d

S A A File No.

[For Other Products, See Index]

ELECTRIC HOT WATER SYSTEMS

(Night Tariff of 0.375d. per kWh. now available in Metropolitan Area)

1. General Description

There are two main types of systems:—

(a) Central storage systems, where hot water is delivered from a centrally-located hot-water cylinder of 40 gallons upwards in sizes to bathrooms, kitchen, laundry, etc.

(b) Isolated systems for installation immediately adjacent to a particular point of use, such as bath heaters, kitchen heaters, surgery heaters, etc. The hot water cylinder sizes in these cases range up to 18 gallons

The normal demand for hot water is met by an electric heating element which is connected to the electricity mains at night (see paragraph 3) To enable abnormal demands for hot water to be met an additional or boosting element can be provided and such element can either be switched on and off by hand as required, or arranged to operate automatically under thermostat control

The hot-water cylinder, which is made of hard, rolled copper, is heavily insulated against heat losses, and is enclosed in a suitably finished metal container

In large premises, such as hotels, large residences etc, it is often necessary to segregate the hot water outlets into groups of adjacent outlets, and provide a system for each group, thus obviating long lengths of hot water piping, and the consequent heat losses

2. Technical Data

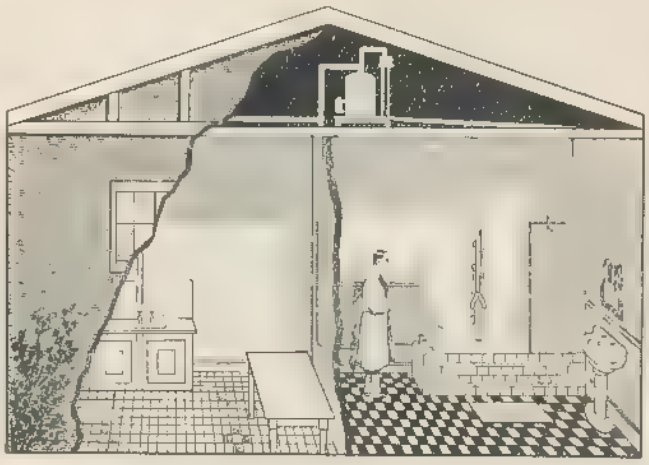
The water-heating capacity of a night rate element is approximately 2 gallons of water per 24 hours, from 60 degs. F. to 160 degs. F., per 100 watts of element capacity. Boosting elements will heat about 3 gallons of water from 60 degs. F. to 160 degs. F. per hour for every 1,000 watts of their capacity.

The quantity of hot water delivered by a system is dependent on the size of heating element, and not on the size of the hot water cylinder.

3. Running Costs

In the suburbs of Melbourne the new night tariff is available in which the charge for electricity consumed through a separate meter by heating elements, which are switched on only between 11 p.m. and 7.0 a.m. (11 a.m on Sundays) by means of a time switch, is 0.375d per kWh. (inclusive of meter and time switch rental).

The electricity can be switched off by the consumer during prolonged absence from the premises (without any charge) and except in those suburbs not directly supplied by the Electricity Commission, no minimum charge attaches to the hot water supply as such.



The heating elements are automatically kept in service for an additional 4 hours (to 11.0 a.m.) on Sunday mornings

Electricity used by the boosting element is charged for at power tariff applicable to the premises concerned. This would be 1¾d. per kWh. for residences on the domestic two-part tariff in Melbourne and suburbs.

4. Advantages of Electric Systems

Convenience. Supply of hot water always available; no attention necessary for fires, etc.

Cleanliness.—No dirt, smoke or fumes given off, no ashes requiring removal

Safety. Absolutely safe and fool-proof; risks of fire and explosion eliminated.

Appearance.—Special vents or unsightly flues unnecessary; storage tank usually installed out of sight (in roof).

Performance.—Silent in operation, dependable for every day in the year, maintenance negligible, low running costs; elements renewable without draining cylinder

5. Recommended Sizes for Specific Purposes

An analysis of hot water requirements should be made in each individual case before installing a system owing to the great variations in the use of hot water in premises and households apparently similar. The following table may, however, serve as a guide to hot water requirements and to the hot water that will be delivered at the cylinder outlet, assuming a cold water temperature of 60 degs. F :—

No of persons	Size of hot water storage tank gallons	[illegible]	Daily quantity of hot water at approx. 160 degs. F	Approx daily cost @ 0.375d per kWh.
2	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	1450	[illegible]	4.21
[illegible]	[illegible]	1750	[illegible]	[illegible]
[illegible]	7	2100	[illegible]	[illegible]
[illegible]	[illegible]	2500	[illegible]	[illegible]

The figures in the above table do not allow for the additional four hours service on Sunday morning, which is provided to meet the usually heavier demand for hot water over the week-end and on Mondays. The extra service would increase the amount of hot water available on Sunday by 50 per cent. more than the daily quantity indicated above, with a corresponding increase in cost for that day only

6. Installation

The hot-water cylinder of a central storage system may generally be located in the roof, under the floor, in a special cupboard, or adjacent to the outside wall of the premises, so long as the cold water storage tank is above the highest hot-water outlet. With some makes the hot-water cylinder must also be above the hot-water taps

The hot-water cylinder of a central storage system should be located near the point where hot water is most frequently used, e.g., the kitchen sink

Hot water piping should be as small as possible in order to minimise heat losses, and ½-inch piping is recommended for general use, except to the bath and shower where ¾-inch pipe is recommended. Piping smaller than ½-inch should not, however, be used It is further recommended that hot water systems be provided with boosting elements arranged to be switched on by hand or automatically as required to enable demands for hot water above normal to be met. The supply to boosting elements is charged for at the ordinary power rate applicable to the consumer, and not at the special night tariff.

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30 *d*
S.A.A. File No.

Carrier Australasia Ltd.

"MANUFACTURED WEATHER"
Makes Every Day a Good Day

FOR OTHER PRODUCTS SEE INDEX

56 HUNTER ST., SYDNEY — 531 LIT. COLLINS ST., MELBOURNE
Telephone, B1512, BW6265 — Telephone: F4926
Cable and Telegraph Address: "MANUWETHER, SYDNEY"

AIR CONDITIONING — DRYING AND REFRIGERATION

Carrier are Contractors to the Governments of England, America, India, Germany, Siam and Australia..

Products, Service and Responsibility

Consultation, design, construction and installation of **Air Conditioning Equipment which is guaranteed to provide definite results in Heating, Cooling, Dehumidifying, Humidifying, Drying in Winter or Summer. Instruments and Control Apparatus for controlling air conditions with definite fixed limits, regardless of outdoor conditions.**

Everywhere Carrier installations are noted for their trim, durable workmanship

There is never a compromise of any sort

Carrier Standards are maintained in every small section of an installation, and Carrier rigid, reinforced, vibrationless, correctly-designed Ductwork is a revelation.

Carrier Australasia is a direct subsidiary of the world-famous Carrier Organisation who have been responsible for the development of every major improvement in Air Conditioning from the commencement of the Industry, which was formed to exploit the scientific findings of Willis H Carrier 30 years ago. English and American engineers form the nucleus of a staff of Australian engineers, thus bringing to the Australian Subsidiary the results of the many years of experience of the Parent Company. In fact, the whole resources of Carrier Research Corporation are always at the complete disposal of Carrier Australasia Limited, and any new developments in this rapidly-growing industry are made available to Carrier Australasia Limited simultaneously with the Parent Company.

We are purveyors of skilled services and incidentally certain mechanical equipment germane to the effective utilization of such services in the interests of the clients

Before you compare mere quotes on Air Conditioning, CONSIDER these points:—

1. Who accepts **responsibility** for the results desired?
2. **Service.** How long will a permanent financially responsible organisation be available after the equipment is installed?
3. The Carrier Organisation backs every installation with a guarantee of **service** and **results.**
4. Will the conditioned air be distributed uniformly to prevent draughts?
5. Temperature and humidity control. Is **automatic control** of conditions provided for, or must you employ labour to guess what changes should be made as the weather alters?
6. Will the air conditioning include refrigeration? Do not be misled by the ideas of so-called experts who have never seen their ideas in practice?
7. **Silence.** Is the equipment guaranteed on a scientific **d.b. basis of sound level?**
8. **Efficiency.** Have you compared the relative **operating costs?**
9. Has provision been made to protect you from any claims under existing patents?

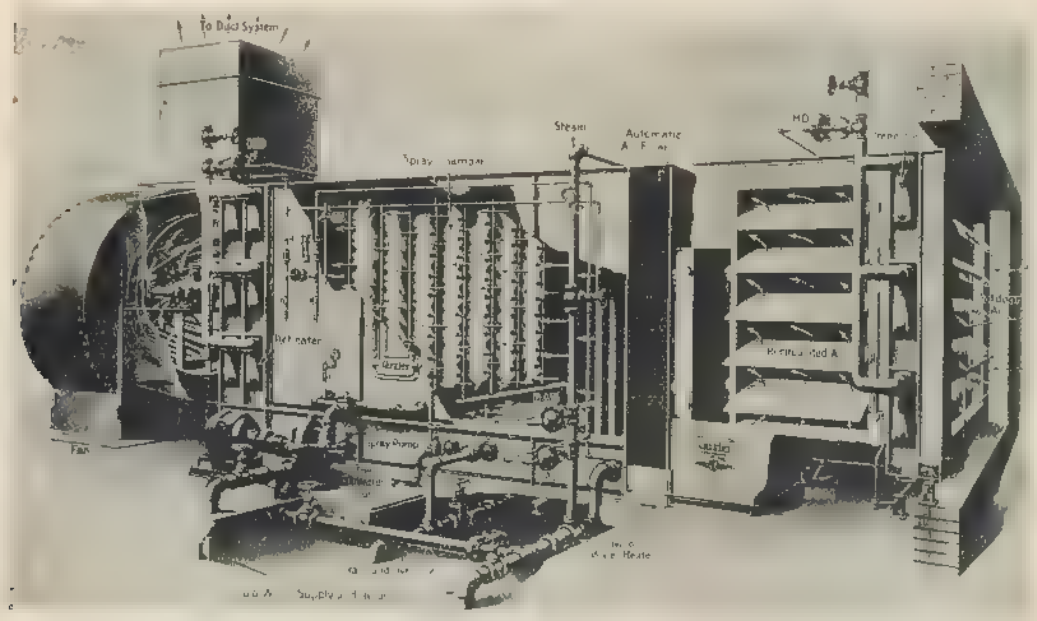
Architects and Engineers are invited to investigate the results of Carrier Systems throughout Australia, and, in fact, the whole world.

Carrier
WEATHERMAKERS TO THE WORLD

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

Carrier Australasia Ltd.

"MANUFACTURED WEATHER"
Makes Every Day a Good Day

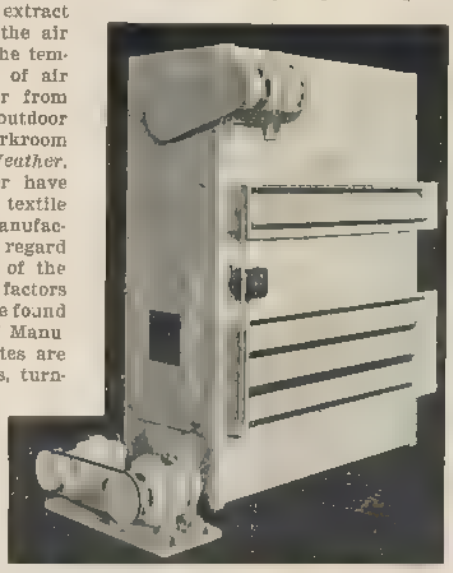


A typical Carrier Automatically Controlled Air Conditioner, which makes "Every Day a Good Day" Showing the Spray Chamber, the automatically controlled Air Dampers, the Headers, the Auxiliary Air Filters and the Centrifugal Fan, which delivers the conditioned air to the Duct System.

Manufactured Weather and Industry

In more than three hundred industries, Carrier Air Conditioning is creating and controlling automatically the atmospheric conditions found most suitable for materials and manufacturing processes. Popularly, this science is known as "Manufactured Weather"—an apt phrase—for we utilise mechanical equipment to extract moisture from, or add moisture to, the air within a building, to raise or lower the temperature at will, to direct the flow of air and control velocity, to free the air from the dust and dirt prevalent in the outdoor atmosphere or gathered from the workroom —*we do actually Manufacture Weather.* Always the weaver and the spinner have sought moist air in which to handle textile fibres. To-day the great mills have Manufactured Weather and are built, without regard to climatic conditions, in the midst of the cotton fields or where the economic factors of labour, power and transportation are found most desirable. In an atmosphere of Manufactured Weather, cigars and cigarettes are now produced by automatic machines, turning out inconceivable quantities with a speed and uniformity of perfection never approached by the old hand methods.

The confectioner and the printer turn to Manufactured Weather; the one to assure an appetising, glossy surface on his confections, the other to control the fickle changes of weather-sensitive paper. In these, and, as we have said, in some three hundred other industries producing articles familiar in the daily lives of all of us, Manufactured Weather has become the useful and often indispensable servant of the progressive manufacturer, freeing him from daily weather uncertainties, improving the quality of his product, contributing to the health, efficiency and happiness of his workers.



A Typical Carrier Unit Air Conditioner

With the purpose of meeting the requirements of the smaller manufacturer, and in order to make Manufactured Weather available to *any* producer whose materials or processes are affected by variable atmospheric conditions, the Engineering, Design and Research Departments of Carrier Engineering Corporation, led by Willis H. Carrier, undertook the design and development of the Carrier Unit Air Conditioner. The result is not a miniature copy of the Central Station Humidifier, which is used in connection with a metal duct air distribution system (as illustrated above), it is not a spray device which throws free moisture into the room with a small amount of air circulation, but it involves a series of revolutionary developments in the handling and conditioning of air which, in their combination, have formed a unit capable of performing efficiently every function of the complete Carrier Central Station System for Air Conditioning.

There are more than 5,000 Carrier Installations in the varying climates throughout the world

(Continued on next page)

Carrier
WEATHERMAKERS TO THE WORLD

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Carrier Australasia Ltd.

"MANUFACTURED WEATHER"
Makes Every Day a Good Day

Carrier Unit Heater

"HEAT WITH UNIT HEATERS"

Of Course!
But Whose to Use?
Here's the Answer!

Carrier Unit Heaters, developed by the leading manufacturer in the field of industrial heating, designed to meet the growing demand for a correctly-designed unit heater of durable construction and pleasing appearance.

Carrier Unit Heaters are a product of original research and thorough engineering, and reflect the high quality of material and workmanship characteristic of all Carrier products.

Carrier B-K Cold Diffuser

Another Engineering Achievement in Refrigeration

The refrigerating and cold storage industry has for many years recognised the restrictions imposed upon adequate air circulation, moisture content control and temperature uniformity by the limitations of natural gravity air circulation. The CARRIER B-K COLD DIFFUSER, operating on the principles of motor-driven, ductless-distribution of cold air, as originated and developed by the engineers of this Organisation, offers not only a complete answer to the inadequacies of natural air circulation, but also provides numerous other definite advantages and economies.

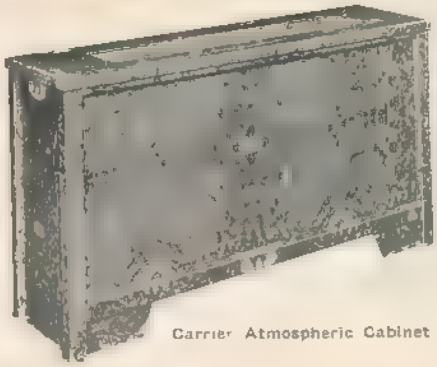
The many advantages of POSITIVE AIR CIRCULATION AND TEMPERATURE UNIFORMITY, as made possible by the carrier B-K Cold Diffuser, have been proven during the past five years by numerous installations for many leading firms. The Carrier B-K Cold Diffuser is, therefore, offered with confidence as an outstanding development and contribution to fill a long felt need in applied refrigeration.

Make Your Own Weather in Your Office or Small Store

Now you can have the delightful comfort of cooled and dehumidified air in summer—the soothing, healthful, invigorating warmth of properly-humidified air in winter!—with the CARRIER ATMOSPHERIC CABINET a practical, inexpensive, automatically-controlled means of providing Manufactured Weather—all of these comforts are yours!

The Carrier Atmospheric Cabinet adds beauty, too. Just look at the illustration on this page and note how this complete, compact, handsome cabinet matches the most costly furnishings. There are three standard finishes—walnut, mahogany or maple—all beautifully grained. Of course, you may have your cabinet finished in any colour you select.

Here is simplicity itself simplicity in construction, simplicity in operation. The air is properly tempered by being circulated through the cooling coil or the heating element, and is gently diffused without drafts into every part of the room. An automatic, electric refrigerating unit (similar to the compact machine in your electric refrigerator) provides the necessary lower temperatures for cooling the air in summer. For heating in winter, the Atmospheric Cabinet may be connected to any steam or hot water heating system, replacing radiators; or the cabinets can be furnished with electric heating elements using electricity as a source of heat.



Carrier Atmospheric Cabinet

Carrier
WEATHERMAKERS
TO THE WORLD

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

FANS AND ALLIED EQUIPMENT

D. RICHARDSON & SONS PTY. LTD.

WHITEHALL ST., FOOTSCRAY, VIC.
MANUFACTURERS.

CROSSLE & DUFF PTY. LTD.

COLLINS HOUSE, MELBOURNE, C.1.
SALES REPRESENTATIVES.

30*d*

S.A.A. File No.

Agents:

Crossle & Duff Bros. Ltd., 52 Bridge Street, Sydney
Engineering Supply Co. of Australia Ltd., Edward & Charlotte Streets, Brisbane.
Frank De Rose & Co., 78 Waymouth Street, Adelaide.
Atkins (W.A.) Ltd., 894 Hay Street, Perth.
Cory-Wright & Salmon, Wellington, New Zealand.

The above organisation has been created for the manufacture and sale of a complete line of fan machinery and associated appliances, particulars of which are now submitted in this journal for the use of Architects and Engineers, in the hope that the information as put forward may not only enable them to select apparatus suitable for their purpose, but that the data given may be of some service in solving the problems with which they have to contend.

Main Ventilating Fans and Air Heaters for Plaza and Regent Theatres, Melbourne. Architects: C. H. Ballantyne

The Richardson line has been wholly designed and manufactured in Australia, and continual progress is made in the development of new material so that the range of appliances available to clients shall be as up to date as possible.

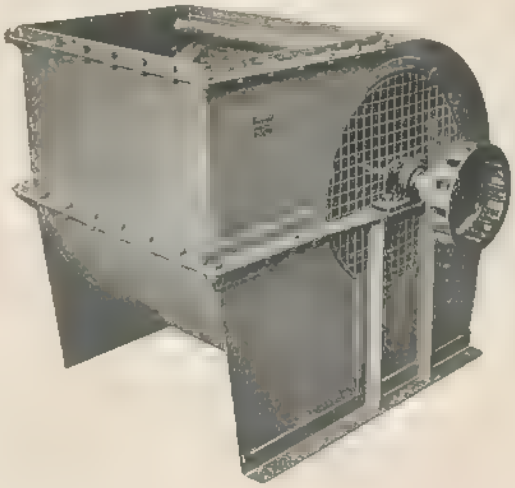
A list of some of the more important installations in which Richardson Fans and associated equipment has been installed is of interest to show the extensive progress that has been made in Australia in this important branch of Engineering as associated with modern building construction.

Representative list of Ventilating and Heating Installations in which Richardson Fans and associated equipment have been used:—

The Melbourne Town Hall
The Williamstown Town Hall
The Malvern Town Hall
The Caulfield Town Hall
The Merri Theatre
The Comedy Theatre
The Myer Emporium, Melbourne.
T. & G. Building, Melbourne
National Bank Building, Melbourne.
National Bank Building, Brisbane.
Children's Hospital, Melbourne
Melbourne Hospital.
The Capitol Theatre
The Palais Theatre.
The Victory Theatre
The Regent Theatre, Melbourne
The Regent Theatre, Fitzroy
The Regent Theatre, Ballarat
The Regent Theatre, South Yarra.
A.M.P., Melbourne
Eye and Ear Hospital, Melbourne
Alfred Hospital, Melbourne
Epworth Hospital, Melbourne.
Queen Victoria Hospital, Melbourne
Manchester Unity Building, Melbourne
St. Vincent's Hospital, Melbourne
State Insurance Building, Brisbane.
J. J. Coles & Co., Melbourne, Sydney, Brisbane, Adelaide, Perth

Partial list of Industrial applications.—

The State Electricity Commission—Induced and Forced Draft Fans for Boiler Plant.
Holden's Motor Body Builders—Ventilating and Heating Fans.
Australian Glass Manufacturers—Cooling Fans
General Motors (Aust.) Pty. Ltd.—Ventilating Fans.
MacRobertson's—Cooling and Ventilating Fans.
Commonwealth Government—Automatic Telephone Exchanges and various applications
Wellington (N.Z.) City Corporation Fans for ventilation of Mount Victoria Tunnel



A Richardson Double Inlet Multivane Fan with Flexible Coupling Half for Direct Coupling.

Note the neat design and sturdy construction, indicative of all Richardson Fans

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D. RICHARDSON & SONS PTY. LTD

CHART FOR THE STUDY AND SELECTION OF HEATING

CLASSIFICATION.	TYPE OF APPLIANCE OR SYSTEM.		SEE SKETCH No	PRINCIPLE.
HEATING (Distribution Only)	Open or Protected Fires			Direct Radiation
	Radiators (Central Generation)	Pipe and Pipe Coils		Direct Radiation
		Cast Iron (Open)		Direct Radiation
		Cast Iron (Recessed or Baffled)		Convection Currents
		Non-Ferric (Cabinet) Non-Ferric (Recessed) (See also page 390)	1 2	Convection Currents
	Unit Heaters (Local Generation)	Suspended (See also page 389)	3 & 8	Directed Air Flow
		On the Floor (See also page 385)	4	Directed Air Flow
	Hot Blast (duct system) (See also pages 382 and 388)		5	Directed Air Flow
	Combined Systems		1, 2 & 5	Directed Air Flow and Direct Radiation
VENTILATION	Natural	Gravity Systems		Pressure difference, i.e., temperature difference between indoors and outdoors
		(a) Windows; (b) Roof Ventilation	(b) 6	(b) Air pressure difference, depending on infiltration of air from inlet openings
	Mechanical (See also page 382 et seq.)	Extraction Only	7	(1) Propeller Fans (2) Centrifugal Fans
		Inlet Only (Plenum System)	5	Centrifugal Fans
		Combined Extraction and Inlet	9	All types of Fans

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VENTILATING AND AIR CONDITIONING APPLIANCES

MEDIUM	TYPES OF BUILDING USED IN.	SUITABLE LOCATION OF UNIT	REMARKS
Gas, Electricity, or Solid Fuel	Residences or where psychological effect is desired	Recessed fireplaces	Not an economical unit for continuous heating
Steam or Hot Water	Greenhouses, domestic garages drying rooms	On walls and, in certain cases, on ceilings	Not as efficient as radiators. Appearance unsightly
Steam or Hot Water	Residences	On floors, close to walls	Difficult to keep clean the only available type of radiator in the past
Steam or Hot Water	Residences, offices, hotels clubs	In walls or close to walls, with baffle plates fixed at top	More efficient than C.I radiators in the open
Steam or Hot Water	Residences, offices, hotels, clubs	Cabinet—on floor close to walls — preferably below windows or at side of other openings. Recessed—in wall recess	The most economical form of radiation—greater efficiency of heating elements—less piping—simple control of heat in volume and direction
Pressure Steam, Exhaust Steam, or Hot Water	Factories, garages, workrooms, small buildings	Suspended from roof trusses and ceilings, or at walls 10ft. to 14ft. above floor level Placed where heat is desired, located like a lighting point	Being out of the way, more working space is available—simplicity of manual control or automatic control
Pressure Steam, Exhaust Steam, or Hot Water	Factories, garages, workrooms, large buildings	May be placed anywhere on the floor	Greater volume of heated air supplied per machine than by unit heater. Air flow directed by simple adjustment of exhaust ports
Steam or Hot Water	Theatres, offices, libraries	Fan and heater in a separate housing or compartment away from area to be heated—generally adjacent to source of medium	Simplest and quietest form of heating large compartments from more or less concealed sources, i.e., grilles in walls and floors
Steam or Hot Water	Theatres, offices, libraries	Same as above Direct radiation may be by open or convection radiators	Used in large compartments when certain obstructions may break up part of a directed air flow from grilles
Natural Air Flow	Seldom used in modern commercial buildings		By the use of chimneys or special built-in vent flues the necessary pressure is obtained no definite control can be obtained
Natural Air Flow	(a) Residences (windows) (b) Factories (roof ventilators)	(b) Highest practical part of roof	(b) The principle of operation of roof ventilators depends on such a construction of the cowl as to cause the wind to induce a suction in the vicinity of the cowl. When the wind ceases the system becomes practically inoperative
Forced or Controlled Air Flow	In buildings where a natural ventilating system should be improved Also in kitchens, small dining-rooms, laundries, etc.	In ceilings—on roof pent houses	(1) Propeller fans have many wide applications—can be successfully installed to improve any system of natural ventilation (2) Centrifugal fans only used where ducts are necessary
Forced or Controlled Air Flow	Very seldom used without mechanical exhausting appliances. Used in summer to carry cooled air into large compartments, as theatres, etc.	In separate fan room, as convenient as possible to the points of entry for the air	This system possesses the advantage that a definite air movement can be created over the area being ventilated
Forced or Controlled Air Flow	In all types of modern buildings	In separate fan rooms—as in basement or on roof	Complete control of ventilation under any conditions is obtained by this system. If desired, a reverse flow of air in compartments can be provided

(Continued on next page)

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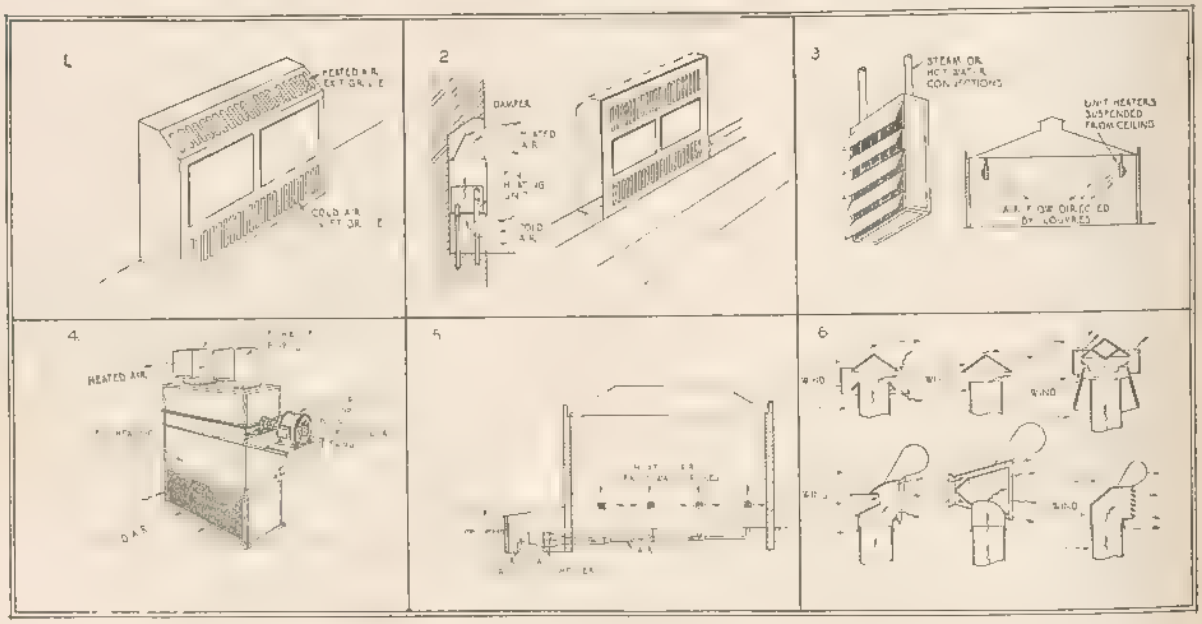
D. RICHARDSON & SONS PTY. LTD.

CHART FOR THE STUDY AND SELECTION OF HEATING,

CLASSIFICATION.	TYPE OF APPLIANCE OR SYSTEM.	SEE SKETCH No	PRINCIPLE.
COMBINED HEATING AND VENTILATING	**Unit Heaters or Heat Diffusing Units** (See pages 385 and 389)	3, 4 or 8	Directed air flows and temperature differences
	Hot Blast Plenum and Exhaust (See page 388)	9	Completely controlled heated air flow
	Radiators and Exhaust	1, 2 & 7	Direct Radiation and Air Circulation
AIR CONDITIONING	Air Cleaners (See page 386)	10 & 12	Air-borne impurities eliminated by contact with some medium
	Self-contained Humidifying and Air-Conditioning Units	11	Dust removed by air washing, and temperature and humidity under control at all times
	Complete installation	9 & 12	A combination of air-washer or filter, humidifier, heating units, etc.



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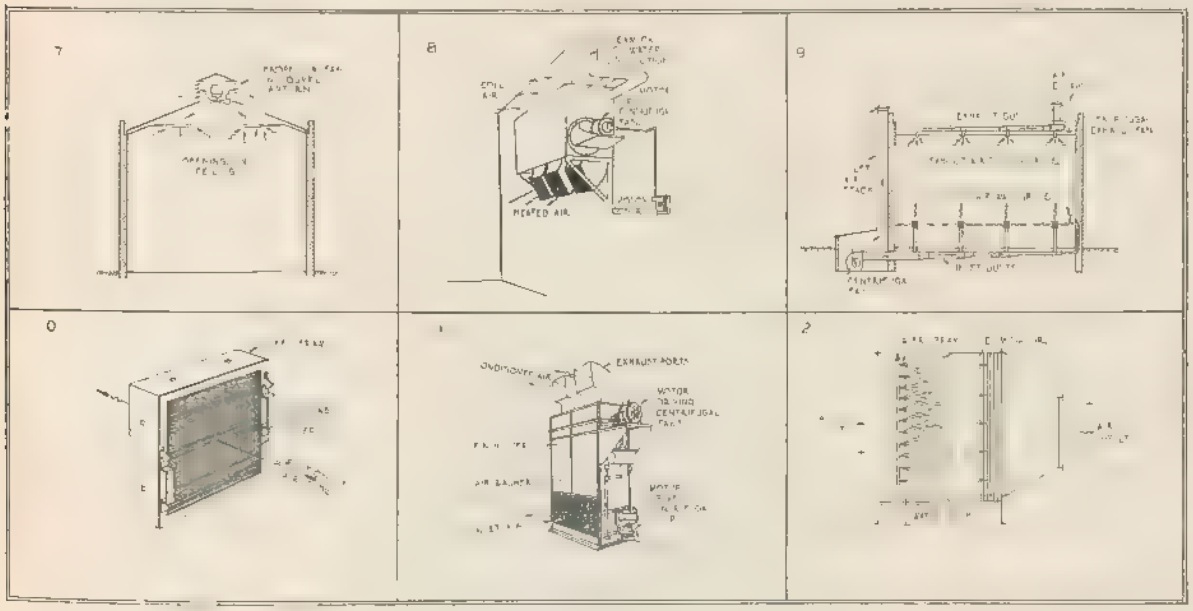
VENTILATING AND AIR CONDITIONING APPLIANCES (*Continued*)

MEDIUM	TYPES OF BUILDING USED IN	SUITABLE LOCATION OF UNIT	REMARKS
Exhaust or Pressure Steam, Hot Water	Factories, garages, assembly rooms	Suspension from wall or ceiling Also available for setting up on floor	Economical system of heating large open areas. Use suspended type for rooms of ordinary height, or where men move about. Use floor type in rooms of high ceiling or where men work at set positions
Exhaust or Pressure Steam, Hot Water (air flow, by ducts)	Theatres, hotels, churches, banks, libraries, offices, halls	In well planned fan rooms	The most efficient and economical way of heating and ventilating any type of modern building
Exhaust, either by Propeller or Centrifugal Fans	Theatres and churches	The fans in suitable location and the heating surface around walls and adjacent to the air inlets	This system can be used with advantage when it is desirable to heat the building when empty before the entry of the audience or congregation, the fan only being used when necessary for ventilation
Viscous Filters (see page 386) Air Washers	Used wherever a clean supply of air is required	In advance of unit fans—necessitating all air to pass through the filters	Essential to good ventilation
Continuous wetted surfaces washes air Fin coils used for reheating	In factories, etc., where clean air with uniform temperature and humidity is necessary	On floor or in separate room adjacent to the area being dealt with This form of unit is the economical solution of the automatic control of temperature and humidity in factories, etc.	A unit heater that washes and humidifies
See above	Where complete and perfect air conditioning under any external conditions is desirable	In combination with Centrifugal Fans	Complete, either manual or automatic control of the temperature, humidity, motion and cleanliness of the air within an enclosure



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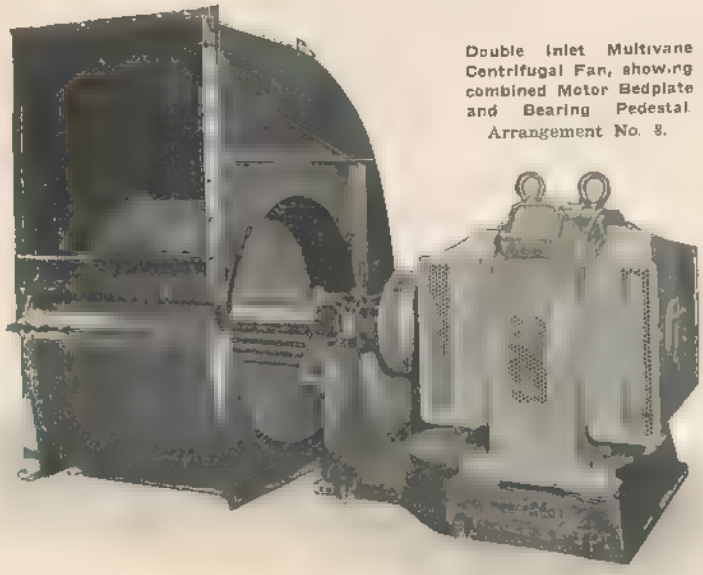
STANDARD MULTIVANE CENTRIFUGAL FANS



Double Inlet Multivane Centrifugal Fan, showing combined Motor Bedplate and Bearing Pedestal. Arrangement No. 8.

The Standard Multivane Fans are built in a range of twelve sizes with capacities from 2,500 c.f.m. to 80,000 c.f.m. for single inlet fans and up to twice this amount for double inlet.

These fans have been designed for moving air at low and medium velocities against moderate resistance, such as the resistance due to air flow through ductwork, heaters, etc. They give vibrationless and quiet operation and require a minimum of attention.

RANGE OF CAPACITIES.

Fan No.	Volume. C.F.M.	Size of Inlet Diam.	Size of Outlet.
2½	1,500- 4,000	1ft. 3in.	1ft. 3in. x 1ft. 6in.
3	2,200- 6,000	1ft. 6in.	1ft. 6in. x 1ft. 2in.
3½	3,000- 8,000	1ft. 9in.	1ft. 9in. x 1ft. 4in.
4	4,500-10,000	2ft. 0in.	2ft. 0in. x 1ft. 6in.
5	6,000-16,000	2ft. 6in.	2ft. 6in. x 1ft. 11in.
6	9,000-23,000	3ft. 0in.	3ft. 0in. x 2ft. 3in.
7	12,000-31,000	3ft. 6in.	3ft. 6in. x 2ft. 8in.
8	16,000-40,000	4ft. 0in.	4ft. 0in. x 3ft. 0in.
9	20,000-50,000	4ft. 6in.	4ft. 6in. x 3ft. 4in.
10	25,000-65,000	5ft. 0in.	5ft. 0in. x 3ft. 9in.
11	30,000-75,000	5ft. 6in.	5ft. 6in. x 4ft. 2in.
12	35,000-90,000	6ft. 0in.	6ft. 0in. x 4ft. 6in.

The above is a very condensed table. Detailed capacity tables are available for each size of fan and will be supplied together with any other information on request.

Construction details, complete capacities and general information are given in Bulletin No. 3201

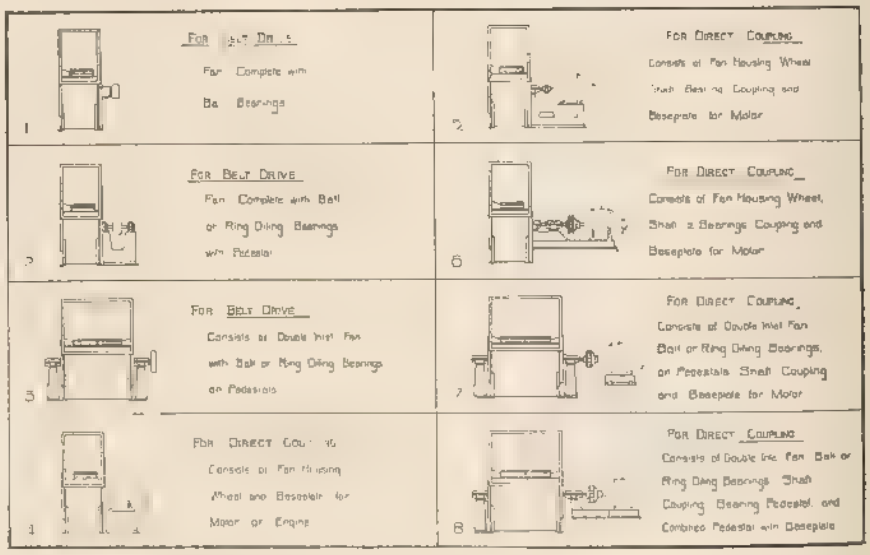
Fan Type

The type refers to the position of fan discharge in relation to the inlet. Fans are supplied in eight standard types designated by the letter A to H.

A = Right Hand Undercast.
B = Left Hand Undercast.
C = Right Hand Overcast.
D = Left Hand Overcast.
E = Right Hand Upcast.
F = Left Hand Upcast.
G = Right Hand Downcast.
H = Left Hand Downcast.

Fan Arrangement

The term arrangement refers to method of drive. There are eight standard arrangements, which are designated by the numbers 1 to 8, as shown on the diagram opposite.



FAN ARRANGEMENT.

"PARVANE" CENTRIFUGAL FANS

In addition to the Standard Multivane Fan, a Richardson High Speed, Centrifugal Fan called the Richardson "Parvane" Fan has been developed and is available in all standard sizes and capacities. This fan possesses the important advantages that it can be operated at speeds much higher than the Multivane Fan for the same duty, and it is non-overloading. These advantages permit the use of motors of the exact horsepower necessary and consequent reduction in first cost when large Direct Coupled Fan Units are being considered.

(Continued on next page)

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BABY CENTRIFUGAL AND PROPELLER FANS

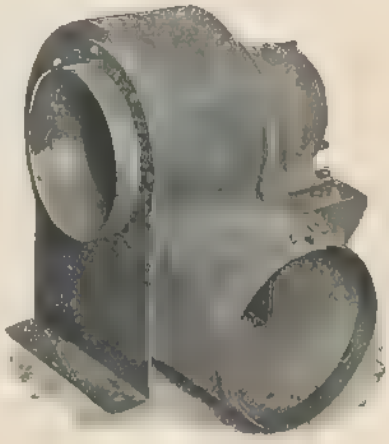
Richardson Baby Multivane Centrifugal Fans, Special Baby Kitchen Exhaust Fans and Baby Propeller Fans are suitable for all applications where the air requirement is less than 2,000 cubic feet for the Centrifugal Fans and 3,000 cubic feet per minute for Propeller Fans. They are furnished either for electric drive or belt driven. The Centrifugal Fans must be used when the air has to be delivered through pipes and the Propeller Fans when moving the air with free intake and discharge. The applications of these fans would be the ventilation of small rooms, kitchens, factories, spray booths, drying chambers, fume cabinets, chemical laboratories, etc., etc.

BABY CENTRIFUGAL AND KITCHEN EXHAUST FANS.

Fan No.	Diam. Inlet and Outlet.	Capacity. C.F.M.	B.H.P.	Weight of Fan. lbs.
1	6 in.	300/500	¼-⅓	26
1½	9 in.	600/1,200	1/6-½	50
2	12 in.	1,000/2,000	¼-1½	84

BABY PROPELLER FANS.

Diam. of Fan.	Capacity. C.F.M.	Speed R.P.M.	B.H.P.	Weight. lbs.
16 in.	1,500	1,450	1/6	55
18 in.	2,200	1,450	¼	60
20 in.	3,000	950	1/3	70



Baby Multivane Fan.
(Electric Drive, Inlet Size.)

Front View.

Back View.

Motor-driven Baby Propeller Fan

ENQUIRY

One Richardson Baby Centrifugal Fan to handle c.f.m. through approximately . . . . . ft. of . . . . . ins. straight pipe with . . right angle bends to be used to exhaust (and/or deliver) this air in accordance with particulars on sketch herewith, the fan to be driven by an electric motor or belt drive. (If motor, state whether one or three phase, A.C. or D.C.)

One Richardson Baby Propeller Fan to handle . c.f.m. to be located in (state position) and to be driven by electric motor (or belt). If motor, state whether one or three phase A.C. or Direct Current and give sketch of application, if possible.

VACUUM CLEANING

For the cleaning of buildings the most satisfactory method which can be adopted is the use of a "Vacuum Cleaner," and the ideal way of employing this is by means of a central installation, consisting of a vacuum producer driven by an electric motor, and a dust collector placed in some convenient position. Connecting pipes are taken from the inlet of the dust collector to the various parts of the building where terminal points fitted with hose connection fittings are placed.

When any portion of the building requires cleaning, it is only necessary to start up the plant, and by the use of a suitable cleaning tool connected to a length of flexible hose which plugs into the hose connection fitting, the cleaning is at once proceeded with.

The Vacuum Producer Unit is a Richardson Multi-stage Centrifugal High Pressure Fan, designed to deliver sufficient air and produce a vacuum sufficiently high for the operation of any required installation.

Two Richardson Vacuum Producers for the Vacuum Cleaning System installed at Myer's Emporium, Melbourne. These machines are connected to two miles of piping.

The size of the plant to be installed depends on the number of cleaning points which will be in operation at any one time, and the length of the maximum run of piping. About 80 cubic feet of air per minute should be allowed for each sweeper so that, for example, for a four sweeper installation a machine having a capacity of 320 C.F.M. would be required, and this machine would have to develop a sufficient pressure to overcome the pipe resistance and provide the requisite suction at the tool.

In laying out the piping, the runs should be made as direct as possible, and care taken that the velocity does not fall below 2,500 feet per minute, or rise much in excess of this value. If the velocity is too low there will be a tendency for dust to settle out in the pipes, and if too high there will be an excessive loss, due to friction, to be overcome.

In addition to the stationary central system, portable units consisting of a small multi-stage vacuum producer, together with a small dust collector, are supplied mounted on a convenient hand truck. These units are complete with vacuum hose and set of cleaning tools, and find their application in factories and situations where the installation of the more expensive central unit system is not justified.

(Continued on next page)

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PROPELLER FANS

Richardson Propeller Fans are manufactured in two designs, one for Direct Drive by electric motor, and the other for Belt Drive. The design in each case enables the fan to operate under the most efficient conditions, having due regard to the speed of the motors available and the conditions of the application. In the case of large fans it is now customary to adopt a multiple Vee Belt Drive instead of direct coupling, in view of the slow speed at which the larger fans must operate.

Belt-driven Propeller Fan.

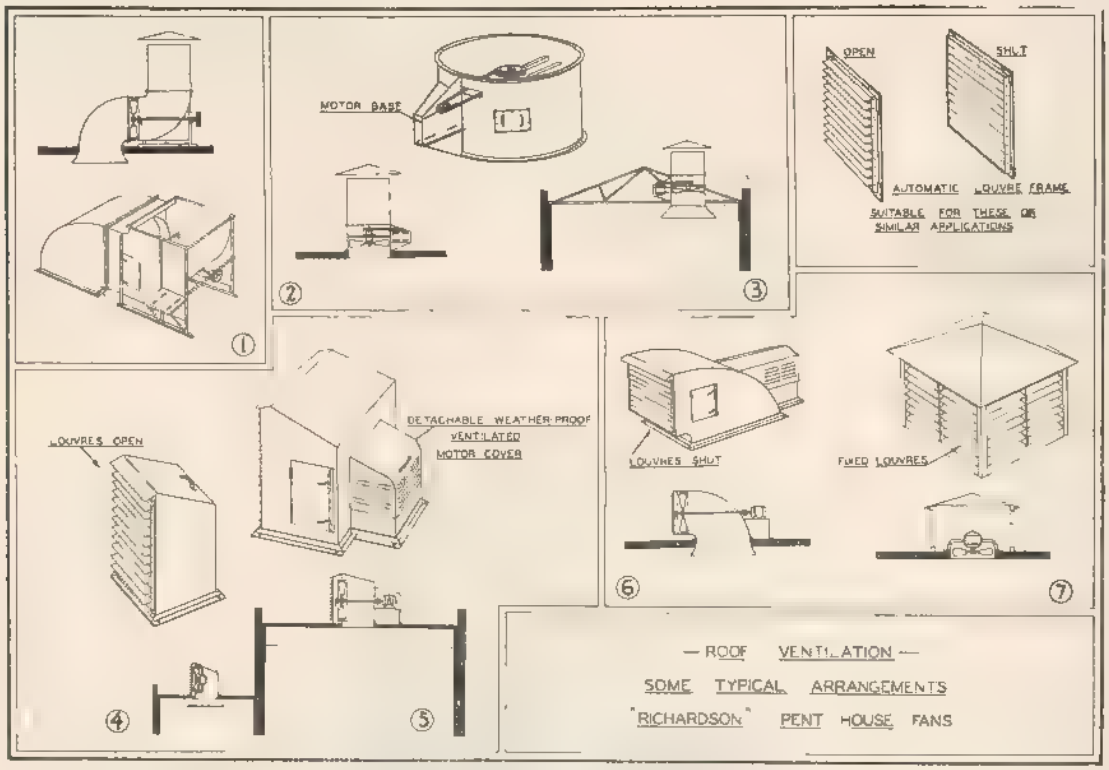
CAPACITY TABLE

Size of Fan.	C.F.M.	B.H.P.	Weight. cwt.
25 in.	4,000- 6,000	¼- ½	1
30 in.	6,000- 9,000	1/3- 1	1½
36 in.	9,000 12,000	½- 1½	2
42 in.	13,000-20,000	2/3- 2½	3
48 in.	17,000-25,000	¾- 3¼	4
54 in.	23,000 35,000	1¼- 4½	5½
60 in.	30,000 45,000	1¾- 6	7
66 in.	36,000-52,000	2 - 8	9
72 in.	43,000-66,000	3 -10	12

ENQUIRY

One Richardson Propeller Fan to have a capacity of c.f.m. when delivering (or exhausting) through state position) to be suitable for wall mounting and to be arranged for electric drive (or belt drive) If electric drive, state whether one or three phase A.C. or Direct Current.

If the quantity of air requires to be varied, state the amount of variation required.



Where it is necessary to move air at low velocities and against low resistance, the Richardson Propeller Fan provides the most satisfactory and economical solution, and the following important points are for the guidance of those installing Propeller Fans.

1. A short duct, not exceeding in total length one fan diameter, extending on both sides of the impeller, and bell-mouthed, if possible, on the suction side tends to straighten the air flow and increases the efficiency of the fan.

2. Where Propeller Fans are installed to operate against resistance, care should be exercised in the design of the approach and delivery passages or ducts. A slightly tapering duct on each side of the fan gives the most efficient operation.

3. If the fan is exhausting or blowing over heater, air filter or any other other obstruction to air flow, care should be taken to see that the total free area is at least equal to the area of the fan opening. Good practice is to make the free area through any obstruction equal or greater in area than that of the fan diameter squared.

4. Keep the air velocities as low as possible—especially where duct work is used, and avoid sudden changes in velocity and direction of air flow.

5. When delivering air to atmosphere avoid situations exposed to wind and weather. If unavoidable arrange for the fan outlet to be screened, being careful to allow ample free area between screen or louvres. The importance of this will be realised when it is considered that a strong breeze blowing into the fan may set up a resistance sufficient to stop the fan, and even reverse the direction of rotation.

6. When conditions vary at different times of the year, arrange for speed variations, as this results in considerable economy.

7. When installing Propeller Fans endeavour to utilize as far as possible the space being dealt with as the air duct.

To decide whether to install a Propeller or Centrifugal Fan consideration must be given to the fact that the most efficient operating condition for a propeller fan is with free intake and discharge. When this is not possible the size of the ducts leading to and from the fan must be sufficiently large to permit of the flow of air at low velocity and the fan should be placed as near to the discharge end as possible. Generally speaking when the duct length is in excess of 20 diameters or its equivalent, the installation of a Centrifugal Fan is necessary.

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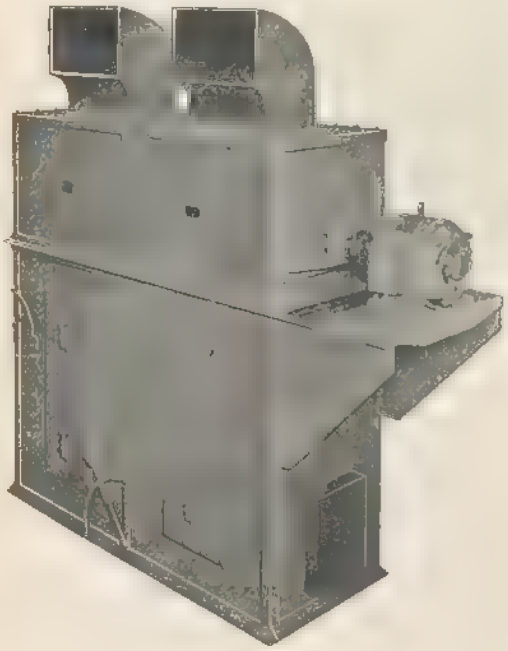
HEAT DIFFUSING UNITS

These units have been designed and built for the express purpose of heating and ventilating industrial plants, machine shops and factories, having large area of floor space. In construction they are simple and compact and are built in various sizes and designs suitable for mounting on the floor (see Sketch 4, page 388) or supporting from the wall (see Sketch 8, page 389).

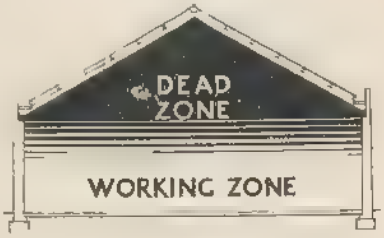


Richardson Floor Type Heat Diffusing Unit.

These units are especially adapted for packing plants, dye houses, laundries, etc. They are ideal for ventilating as well as heating and in summer can be arranged for cooling when required.

Richardson Heat Diffusing Units deliver and hold the heat down where it is most required.

They quickly bring the rooms to the required working temperature by immediately delivering the warm air to the working zone and holding it there by recirculation.



The basic principles of the Richardson Heat Diffusing Units save up to 25 per cent. of fuel bill by cutting down waste caused by overheating the upper portion or dead zone of the building. This fault is characteristic of the usual factory heating systems, which have to be operated at maximum capacity to heat the working zone, the upper zone being overheated, resulting in a costly waste of fuel.

Richardson Heat Diffusing Units can be automatically controlled, thus giving a variation of heat output to coincide with the fluctuations in outside temperature, the maximum volume of air being maintained throughout, but the temperature varying constantly, the air being diffused at a temperature sufficient to balance heat losses from the building and maintaining uniform heating of the working area with considerable saving in fuel consumption

These units operate efficiently and silently. The Richardson Centrifugal Fan has large volumetric capacity at slow and medium speeds.

The heating surface is of the Macintosh Copper Fin Type, strongly constructed with cast-iron headers suitable for operating at any desired steam pressure. (For further data on Copper Fin Type Heaters, see page 388.)

OUTPUT CAPACITY—RICHARDSON HEAT DIFFUSING UNITS.

Unit No.		R.P.M.	Motor H.P.	Cub. Ft. Air Per Min.	Entering Air at 60° F. 5 lbs. Steam. Outlet Temp. °F.	B.T.U Per Hour.	Lb. Cond. Per Hour
1	D.1	151	1,450	¼	1,500	125	96,000	99
2	D.1	152	1,450	½	3,000	125	192,000	199
1	D 1	201	950	¾	2,600	125	166,000	172
2	D 1	202	950	1½	5,200	125	[illegible]	344
1	D.1	251	750	1	3,500	125	225,000	233
2	D 1	252	750	2	7,000	125	450,000	466

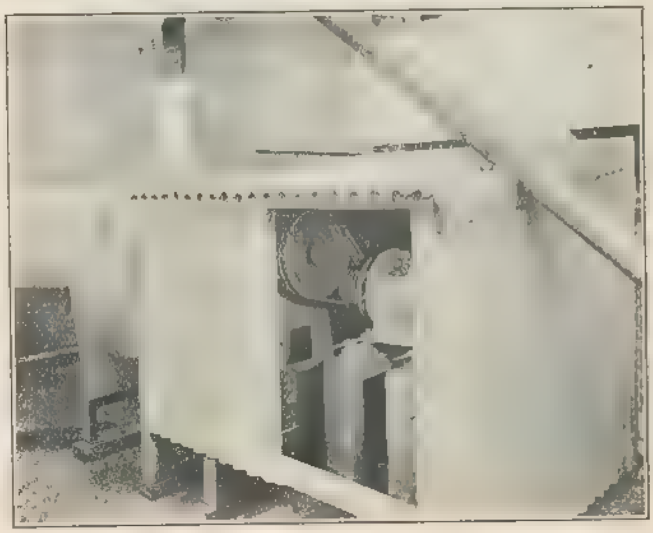
Larger sizes made for any duty

MULTIPLE VEE-BELT DRIVE

In the past when a ventilating fan has been installed, it has been customary to direct drive this by means of an electric motor, and, while this arrangement is ideal so far as compactness is concerned, it is not always desirable from other points of view.

It is very often found that fan speeds higher than those which are advisable for the best efficiencies and quietness of operation have to be used because of the speeds of the driving motors and, similarly, low speed motors, of high first cost, have to employed.

The illustration shows how a multiple Vee belt drive may be utilized to drive a fan at the speed which gives maximum efficiency with minimum noise, irrespective of the motor speed which is selected for best operating conditions and low first cost. The very short driving centres which are used make this type of installation very compact.



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RICHARDSON VISCOUS TYPE AIR FILTER

Necessity of Clean Air

An air supply free from dirt or other solid contamination is highly desirable. All air, even the air of the countryside, contains a certain amount of dirt, but the air of towns, especially that of industrial areas, contains such an amount as to have a very detrimental effect on the health of the inhabitants. Moreover, the effect of dirty air in all kinds of machinery is to shorten its effective life and very much increase the cost of maintenance

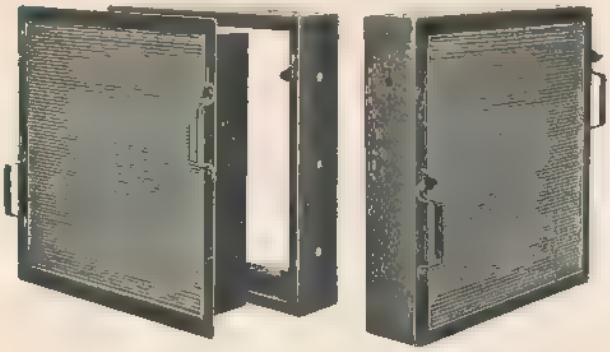
Many industrial processes are dependent for their success on being conducted in a clean atmosphere, and public opinion at the present day demands that places in which food products are prepared and handled should be kept in a clean state, not only as regards the place itself, but also the atmosphere Apart from this, clean air means a very considerable saving in the cost of decoration, cleaning, etc.

It must be obviously less expensive and troublesome to trap the dirt in one central position than to collect it after it has settled on walls or furniture, and thus the best method of cleaning is to pass the air through a really efficient filter in which dirt is effectually trapped.

AIR FILTERS

There are several types of filters in use, but all of them possess inherent defects in a more or less pronounced degree, e.g., the cloth screen which quickly becomes choked, the air washer resulting at times in over humidification (it will not remove greasy particles such as soot), etc.

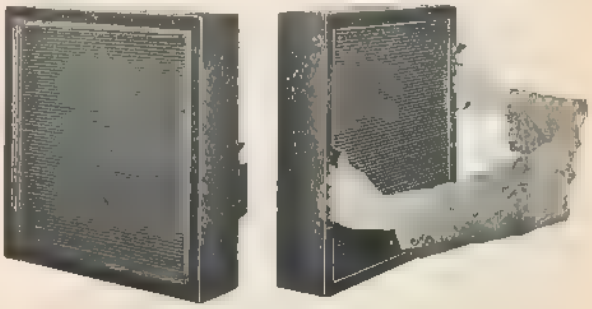
The Richardson Air Filter is designed to supply a want for a thoroughly reliable and simple air cleaner which will have an efficiency as near as possible to the 100 per cent. point



Front view, showing unit removed from frame (at left)
Front view, showing unit fixed in frame (at right)

Principle of the Richardson Air Filter

The principle of construction is that of a large number of plates spaced uniformly in a frame or holder. The plates are corrugated in a special manner and therefore expose a relatively large surface to the passage of air. The whole frame is dipped in a viscous fluid, and the air in its passage between the corrugated plates is buffeted from side to side, and the solid particles of dirt, etc., however minute, are retained on the sticky surface of the plates. The cleaning properties of this filter are highly efficient and it is practically impossible to detect the slightest trace of dirt in the air which has passed through a Richardson filter, no matter how dirty its previous condition



Rear View, showing felt gasket for making dust-tight joint between unit and frame (at left).
Front view, showing thumb-operated latch for removing unit from frame (at right)

Description

The Richardson filter unit (see illustrations) consists of two parts, an outer frame and an inner case containing the filtering media

The construction is metal throughout. The outer frame is so arranged that a number can be bolted together to form a filter of any capacity or any desired shape to fit into the space available. It occupies only a depth of about four inches

The inner case, removed from the frame by handles, holds a number of plates of special section, which are fixed in the case at regular intervals They are covered all over with the special viscous liquid, to which adheres the dirt collected from the passage of the air—free moisture in the air is also retained

The cases are locked in position in the frame by automatic latches When removing the case for cleaning, the handles are grasped, thus putting the thumbs in a natural position to release the latches To ensure an air-tight construction between outer frame and inner case a felt gasket is attached to the back flange of the frame and makes a close contact with the case, thus assuring at all times the full benefit of the high efficiency of the filter

APPLICATION

The most important use is for cleaning the air to be used for ventilating any form of building, shop, office, hospital, ship, restaurant, etc. The Richardson will trap soot, fog, grease, or dirt with equal facility

These filters are especially recommended for filtering the air of telephone exchanges, and all places where delicate scientific apparatus is used or stored

For all drying processes—for painting, enamelling and varnishing shops—for printing works—for power plants, etc.

(Continued on next page

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Erection and Arrangement

The erection of the Richardson Filters is simply and quickly performed by bolting together the specially drilled filter frames to form the complete filter, which in itself is a rigid and self-supporting structure.

It is desirable for cleansing purposes to keep the bottom row of frames a few inches from the ground.

The arrangement of the complete filter can be varied to suit the space available, or to fit any other set of circumstances.

The installation drawing shows the space required for any number of units up to 60, and the several arrangements possible in limited space. Others will readily occur to the Engineer or Architect.

MAINTENANCE

Under average normal conditions the filter requires cleaning but once every two months. The interval, of course, depends on the existing conditions and may vary from five to twelve weeks.

In large installations the rotation method of cleaning is generally adopted. By this means a number of cells are cleaned at regular intervals, thus maintaining an average condition and ensuring a constant air supply through the filter.

Spare filter units can be supplied to facilitate the cleaning of filters while plant is in operation.

CLEANING BY CONTRACT

Arrangements can be made for the annual maintenance and cleaning of the filter, when this form of service is preferred.

METHOD OF CLEANING

The cells to be cleaned are removed from their frames and shaken about in hot, strong soda water, and then rinsed in clean water and allowed to dry. They are then dipped in the adhesive liquid and drained before replacing in the outer frame. Special galvanized heating and cleaning tanks are supplied for this purpose.

ARCHITECT'S SPECIFICATION

SPECIFICATION FOR SUPPLY OF AIR FILTER

The Air Filter shall be of the Viscous Type and capable of efficiently cleaning.. .....cubic feet of air per minute.

PERFORMANCE.—The sub-contractor is to state definitely in his tender the cleaning efficiency of the filter and the resistance to air flow when handling the specified quantity of air per minute. Tenderers to suggest any convenient means by which the guaranteed cleaning efficiency may be measured. In the case of the unit filter, the resistance to be stated when clean, and when requiring to be cleaned.

ERECTION REQUIREMENTS.—The filter shall be complete in every respect ready for erection. All bolts, gaskets and accessories of any kind whatsoever that may be necessary for its assembly and erection shall be supplied.

The erection of the filters shall be by others.

CHARGING AND MAINTENANCE.—The units shall be supplied charged ready for use, and the tenderer is to state a price per annum for which he undertakes to service the filter, maintaining it in first-class condition, this price to provide for the supply of all charging liquid and the labour necessary to re-charge the filter units.

DRAWINGS, ETC.—A full description of the equipment shall be supplied, together with a plan giving the overall dimensions, which must conform to the space available for the accommodation of the air filter.

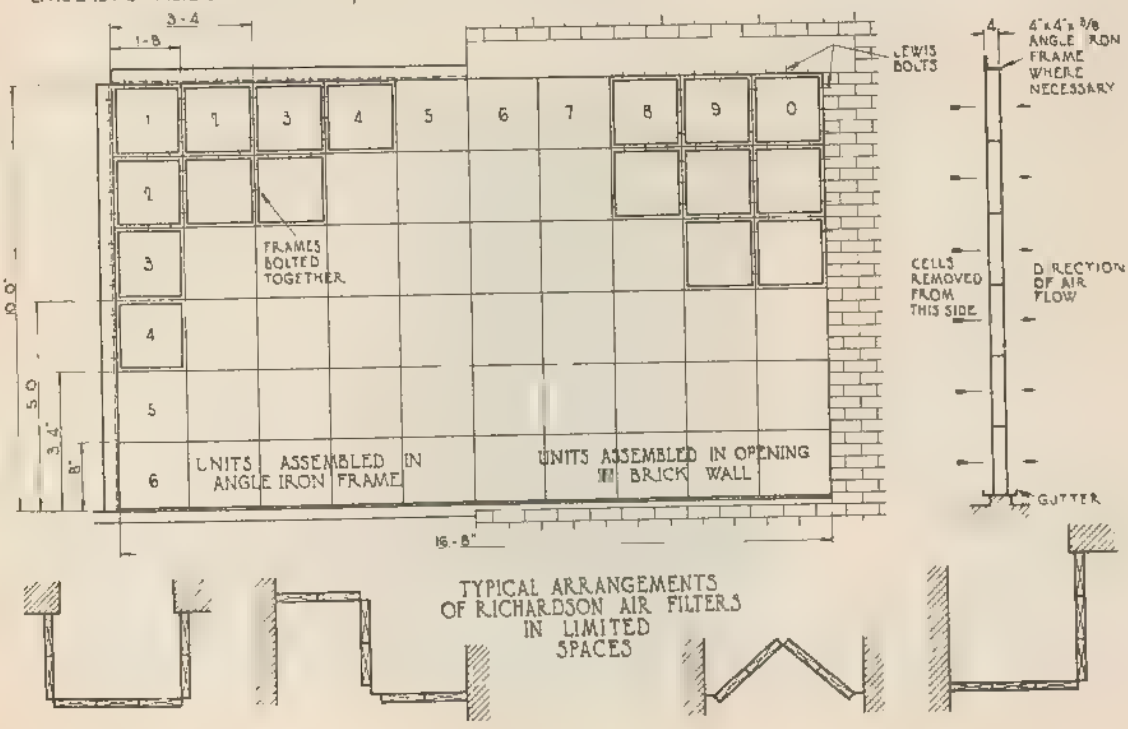
The tenderer is to state the Country of Origin of the equipment offered, together with a list of some of the more important users of the type of filter offered.

DATA AND DIMENSIONS — RICHARDSON VISCOUS TYPE AIR FILTERS

SIZE OF FILTER FRAME — 10"x 10"x 4"
EFFECTIVE OPENING IN FILTER CELL — 2¼ SQ. FT.
CAPACITY OF EACH UNIT — 1000 C.F.M.
EFFICIENCY OF FILTER — 98%

SURFACE AREA OF FILTER PLATE IN EACH UNIT — 1000 SQ. FT.
RECOMMENDED LINEAR VELOCITY OF AIR THROUGH UNIT — 400-500 FT. PER MIN.

RESISTANCE TO AIR FLOW — ¼" W.G.
WEIGHT OF FILTER CELL — 3½ LBS.
WEIGHT OF FRAME — 9 LBS.
TOTAL WEIGHT OF UNIT — 41 LBS.



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30 *d*	MACINTOSH & CO. PTY. LTD.	CROSSLE & DUFF PTY LTD.	COPPER FIN-TYPE HEATING EQUIPMENT
S.A.A. File No.	8 DORCAS ST., SOUTH MELBOURNE. *Manufacturers*	COLLINS HOUSE, MELBOURNE, C.1. *Sales Representatives*	

Agents:
Crossle & Duff Bros. Ltd., 52 Bridge Street, Sydney.
Engineering Supply Co. of Australia Ltd., Edward & Charlotte Streets, Brisbane.
Frank De Rose & Co., 78 Waymouth Street, Adelaide.
Atkins (W.A.) Ltd., 894 Hay Street, Perth.
Cory-Wright & Salmon, Wellington, New Zealand

PRODUCTS

Fin-Type Heating Elements, which may be built up to make any form of unit required.

Blast Heating Units, which are made in standard sizes and are complete with matching angles to take the ducts.

Unit Heaters. These are made in standard sizes and are classified according to the fan size and B.T.U.'s capacity. They are complete with heater and fan combined in a casing of neat and pleasing appearance.

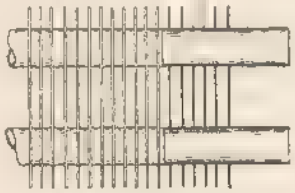
Cabinet and Concealed Type Heaters are made with standard elements, but may be supplied with varying types of cabinet or grill to suit surrounding furnishings.

CONSTRUCTION

Elements

The Macintosh type heating element is made up of ⅝in. solid drawn copper tube threaded with thin copper fins, evenly spaced over the entire length.

After the tubes have been finned, the whole is carefully tinned, thus giving the fins metallic contact with the tube and preventing corrosion.



Section of Drawn Copper Tubing with Rectangular Copper Fins.

Headers

The headers in all cases are made of mild steel of ample dimensions to withstand the required pressures with a very liberal margin of safety.

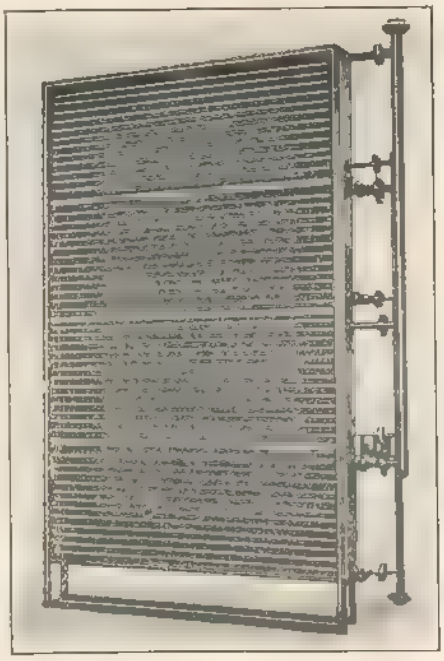
The headers are machined on the upper face to take the machined cover, which is fitted with a gasket and securely bolted down.

Fitting of Elements

The required holes are drilled in the headers and the tubes of the elements are carefully expanded into these holes. The ends of the tubes are then beaded to add to the strength of the unit.

Connections

The header covers are tapped to take the required size of steam or hot water pipe. Pipe connections between units are not supplied unless specially ordered.



Macintosh Copper Fin-Type Heater with tubes mounted horizontally.

FEATURES

Efficiency

The high efficiency of the Macintosh heater is due to the careful selection of materials, copper having a very high thermal conductivity together with strength and lightness.

Rigidity

The construction of the Macintosh heater is such that each unit is complete in itself; the tubes are securely fixed to heavy cast-iron headers and the whole is supported in an angle-iron frame or welded iron box, according to the type of heater, except in the case of the concealed type heater which merely has the elements and headers.

Weight

The weight per square foot of heating surface is only about one-sixth of that of cast-iron heaters. One square foot of heating surface occupies only twelve cubic inches.

Test

All Macintosh heaters are tested to 100 lbs. per sq. inch, or double working pressure, whichever is the greater.

General

The Macintosh heater can be used to advantage for almost any purpose as it is practically non-corrosive, light in weight, compact and rugged in construction.

It is made in standard sizes and may be used as single units or in banks, according to the size of unit required.

It may be used to equal advantage on either hot water or steam up to 100 lbs. per sq. inch or higher pressures when required.

(Continued on next page)

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PRINCIPLES OF OPERATION

As the amount of heat given off from a certain object is dependent upon the temperature and the conducting surface of that object, the former being fixed, we have paid special attention to obtaining the maximum conducting surface in a minimum space.

We have achieved this objective by placing thin copper fins on solid drawn copper tubes, the fins being specially designed so as to cut down the amount of dead metal to a minimum when operating in an average velocity of air flow.

The elements are all fitted into a header at either end, the hot water or steam enters at one header and passes through the tubes of the elements to the other, giving up its heat to the walls of the tubes, which in turn conduct the heat to the fins The heat is then conducted from the tubes and fins to the air.

It is due to perfect conduction being required that the fins are tinned to the tubes

BLAST HEATING UNITS

Description

The Macintosh Blast Heating Unit consists of a fin-type heater, previously described, in a single unit or a combination of units mounted in a rigid angle-iron frame. This frame is drilled ready for the reception of the duct work.

The angle frame is integral with the legs which normally support the heater 9 in. from the floor, this may, however, be varied to suit requirements.

Application

The Macintosh Blast Units can be used wherever a supply of heated air is required for drying and heating operations in various processes and for conditioning air for theatres, factories, etc.

On account of the low losses and the small mass of metal in the Macintosh heater, it is very sensitive in operation and may be automatically controlled by a thermostatically controlled valve to great advantage.

Dimensions

A large range of sizes are available, made up of standard units. The standard units are made in four standard header sizes:—

Type A—18 in. wide. Type C—24 in wide.
Type B—21 in. wide. Type D -27 in. wide.

all by 6 in deep, and may have either one, two or three stacks of elements varying in length from one to five ft

Full particulars of capacities, and dimensions, are available on application

Ordering

When making enquiries, the following information should be given:—

1 Whether heater will be used with steam, giving pressure, or hot water, giving mean temperature of water
2. Cubic feet of air to be heated per minute
3. Velocity of air in feet per minute or size of duct
4 Temperature of air to be heated.
5 Temperature rise required.
. Plan showing dimensions of room or building, construction, windows and doors

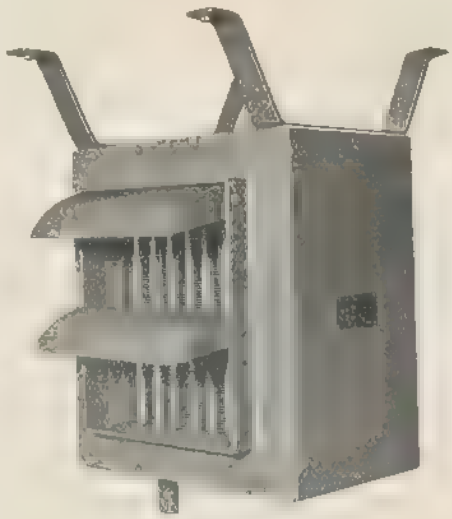
UNIT HEATERS

Description

The Macintosh Unit Heater may be divided into three parts: The standard Macintosh heating unit which is mounted in a sturdily constructed and attractively finished metal case. At the rear is mounted a small fan fitted to the shaft of an electric motor, which is supported by means of four neat brackets. Attached to the front of the unit is a series of deflectors to direct the flow of the air.

Principles of Operation

The principle of the unit heater is to heat a room or building by means of passing the air contents of the room over a heating unit and deflecting the air to the most favourable parts. As the mass of metal in the heater is particularly small, it is very sensitive to temperature variation, and therefore lends itself very readily to automatic control by means of a thermostatically operated valve. Alternatively, as the capacity of the heater is dependent upon the velocity of the air passing the element, the temperature control may be obtained by means of a thermostatically operated switch in the motor circuit



Front view of a small Unit Heater showing the deflectors, the number of which are increased with the size of Heater.

Application

The combined lightness of weight, high efficiency, low cost of installation and small space occupied by the unit make the Macintosh Unit Heater a very favourable proposition for the heating of factories, warehouses, large offices, drying rooms, etc.

Ordering

When placing an order or making an enquiry, please give the following information:—

1. Type of building (whether brick or wood), also sketch.
2. Cubic feet of air to be heated.
3. Temperature rise in air required.
4. Maximum air temperature required.
5. Whether heating medium is hot water or steam, giving mean temperature of water or steam pressure
6. Electric supply, whether D.C. or single or three phase A C and voltage
7. Whether required for very silent operation or otherwise.

(Continued on next page)

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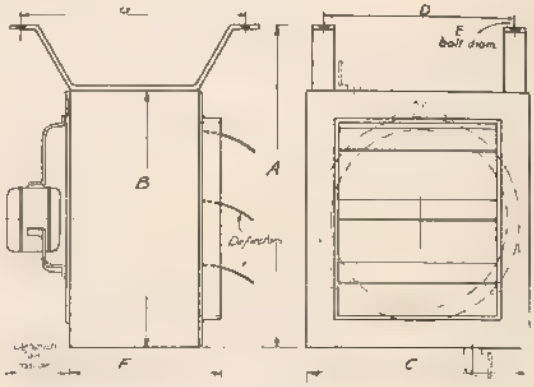
UNIT HEATERS (*Continued*)

Rear view of small Unit Heater showing the neat arrangement of the fan and motor.



DIMENSION.

Size	A	B	C	D	E
15	2ft. 3in.	1ft. 9in.	1ft. 6¼in.	1ft. 3¼in.	8in.
18	2ft. 6in.	2ft. 0in.	1ft. 9¼in.	1ft. 6¼in.	8in.
21	2ft. 9in.	2ft. 3in.	2ft. 0¼in.	1ft. 9¼in.	8in.
24	3ft. 0in.	2ft. 6in.	2ft. 3¼in.	2ft. 0¼in.	8in.
27	3ft. 3in.	2ft. 9in.	2ft. 6¼in.	2ft. 3¼in.	8in.

No. of Stacks—2: F, 14 in., G. 20 in.; 3: F 15 in., G. 21 in.

CABINET AND CONCEALED TYPE HEATER

Description

The cabinet type heater consists of a Macintosh heating unit mounted in an attractive casing, suitable for placing on the floor. The concealed type heater is similar excepting that it is intended for mounting in a cavity in the wall and is supplied with grilles of varying designs to permit circulation of the air.

Principle of Operation

The principle of the concealed and cabinet type heaters is such that the air coming in contact with the heater expands and naturally rises. As the heated air is directed upwards by the casing the velocity of air passed by the heater increases considerably, thus causing a good circulation of heated air in the room.

Application

The concealed type heater is specially designed for use in the home, as it takes up very little room and provides an even and comfortable temperature throughout the room, heating being effected by means of circulated heated air rather than direct radiation, as obtained with the ordinary cast-iron heater.

The cabinet type heater may be used in the home, but is more especially designed for use in offices, the principle of operation being the same as that of the concealed type.

Ordering

When placing on order or making an enquiry, please give the following information:—

1. Construction of walls and ceiling (with sketch) showing position of doors and windows.
2. Cubic feet of air to be heated.
3. Temperature rise required in air.
4. Maximum temperature required.
5. Whether heating medium is hot water or steam, giving mean temperature of water or steam pressure.

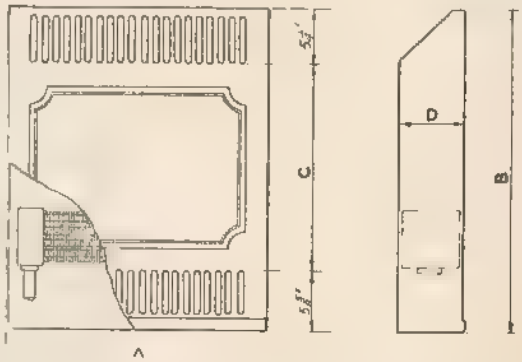


Table of B.T.U'S per Hour for Macintosh Concealed Type Heaters

Heater No.	Dimensions. A.	Dimensions. D.	Hot Water—Mean Temperature 180 Degs. F. Cabinet Height "B." 20in.	26in.	38in.	Low Pressure Steam. Cabinet Height "B" 20in.	26in.	38in.
224	24in.	4in.	2400	2900	3400	3300	4400	5200
230	30in.	4in.	3200	3900	4600	4400	5900	7000
236	36in.	4in.	4000	4900	5700	5500	7400	8700
242	42in.	4in.	4800	5800	6900	6600	8800	10400
32[illegible]	24in.	6in.	3500	4400	5[illegible]00	4900	6600	7800
3[illegible]	30in.	6in.	4700	5[illegible]00	6800	6500	8700	1[illegible]00
3[illegible]	36in.	6in.	6200	7400	8600	8300	11100	13100
342	42in.	6in.	7400	8900	10400	9900	13300	15700

(*Continued on next page*)

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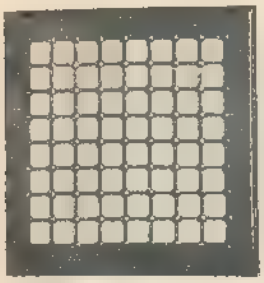
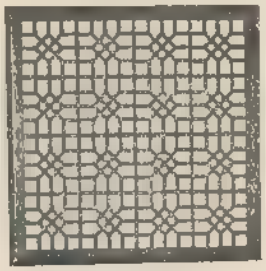
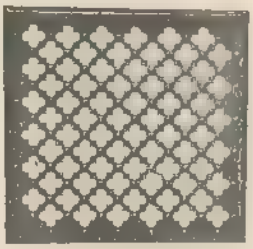
PERFORATED SHEET METAL



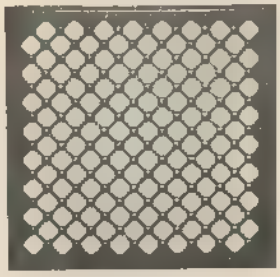
No. 4 Design—⅜in. Hole, ⅛in. Bar.
No. 11 Design—1in. Hole, ⅛in. Bar
No. 7 Design—1⅛in. Hole, ⅛in. Bar.



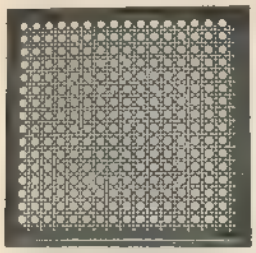
No. 15 Design.
50 per cent. Free Area.



No. 6 Design.
50 per cent. Free Area.



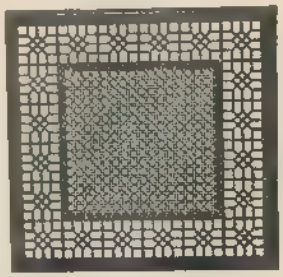
No. 14 Design—⅜in. Hole, ⅛in. Bar.
No. 13 Design—1in. Hole, ¼in. Bar.
No. 5 Design—1⅛in. Hole ¼in. Bar.



No. 16 Design
50 per cent. Free Area.

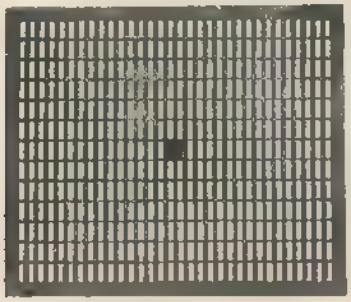
We supply Register Faces, Grilles, Louvred Panels, Gratings, and Perforated Sheets in Brass, Copper, Zinc, Steel, etc., in various gauges and finishes for concealing and protecting radiators, heating and ventilating work, partitions and general ornamental work.

We illustrate on this page a few of our many designs of perforated metal grilles and ventilators. A great variety of combination designs are also available. Any of the designs on this page may be attractively worked up, using one design as the border and another as the centre of the grille. (See illustration at right.)



Ornamental Panel; any size. Plain margins left where required.

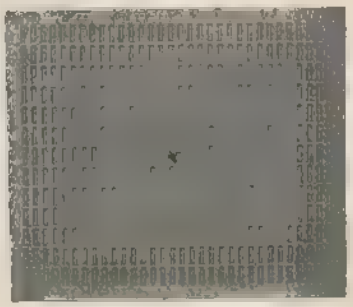
TELEPHONE FOOTSCRAY 417-418-419-420



HIT AND MISS VENT FACES

(Left)—Open.
(Right)—Shut.

Any Size.



WRITE FOR CATALOGUE

Louvre Panels.
Any size sheet perforated where required

Length of Louvres:
2 in., 3 in., 4½ in., 6½ in., 8½ in., 10½ in., 18½ in.

ROUND, SQUARE OR SLOTTED HOLES IN ANY THICKNESS UP TO HALF INCH FOR GRATES, DRAIN COVERS, WALL VENTS, ETC.

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30*d*

S.A.A. File No.

MALLEYS LIMITED

Head Office and Showroom:
50-52 MOUNTAIN STREET, SYDNEY

Postal Address
BOX 2, P.O., GEORGE STREET WEST, SYDNEY

Brisbane Branch: WATERS STREET, VALLEY

Air Conditioning Engineers
and Dependable Equipment for Moving, Cleansing and Conveying Air

ALL RED FANS

[For Other Products, See Index]

Products

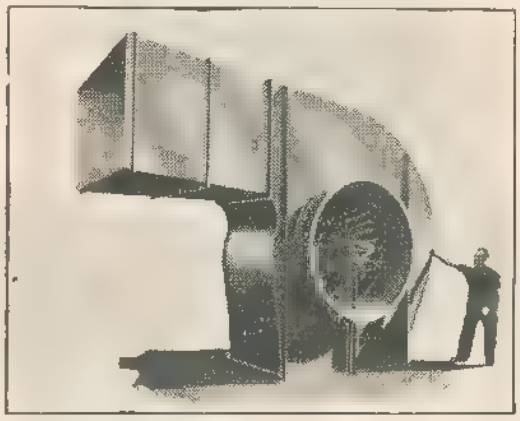
Manufacturers of All Red volumetric high efficiency Fans and Exhausters for mechanical ventilation. All Red high pressure Blowers and Exhausters for dust, shaving, fume removal and grain conveying. Air Washers, Unit Heaters, De-humidifiers, Viscous Filters and all Ventilating Requirements.

Specialities

Multivane Fans.—The Malley Multivane Fan is designed for moving a large volume of air through ducts or piping against moderate resistance with the least possible expenditure of power. It is the most efficient large volume fan made

We have supplied these fans for ventilating plants, heating and ventilating, drying by warm air, smoke, steam and fume removal plants and many other applications.

The Wheel is a special feature, being made up of a number of blades having the depth tapered to ensure an even and uniform flow of air across the whole width of blade. As a result of our 30 years' experience of Fan Building we have a evolved a rugged, long-life Fan with all parts specially heavy to avoid any possibility of vibration or noise



Main Exhaust Fan Installed at Capitol Theatre, Sydney, by Malleys Limited, 1928

Planing Mill Fans and Exhausters

Planing Mill Fans or Exhausters are rugged, heavily constructed fans evolved by "Malleys" for dust collecting and conveying or for collecting the dust and chips from woodworking machinery and for dust removal from road material, crushing and mixing plants, boot and shoe machinery and for the handling of hot gases, and for the removal of dust and dirt from coal, cereals, etc.

"Standard" Exhauster Fan

We also design, construct and erect complete Dust Collecting Plants for every type of dust, using the latest type separator, or dust bag filters.

Drying Rooms and Stoves for every purpose designed and erected complete

Propeller Fans

When it is required to remove large volumes of air against low resistance the Malley Propeller Fan is most efficient, because it is designed on the aeroplane propeller practice. The ease of application to direct connected drive has resulted in a growing demand for this type of Fan for special ventilating work. See page 396 They are also adapted as illustrated to meet the requirements for paint, spray booth work, etc.

Propeller Fan

Automatic Louvre.

Automatic Louvres

Where it is required to ensure that air passes through openings in one direction only, specify thus

Provide in openings ... .in. x .....in. Malley Automatic Self-closing Louvre. Blades shall be of aluminium mounted on steel pivots swinging in bronze bearings. All mounted in a frame to suit opening. Form openings with selected steel architraves and protect louvres with expanded metal or crimped wire mesh (if required).

Steel Plate Blowers

To meet the demand for a moderately priced Blower, we have designed a small Steel Plate Blower illustrated on page 397. This is a highly efficient machine that may be applied to a variety of uses The performance table should be used when making a selection.

Malleys Unit Air Conditioner

To combat the dangers of unconditioned air and supply the requirements of a long felt want at a price that is within reach of all, we have designed a small, self contained unit which, in the winter months, will give a supply of warm, washed and humidified air at a running cost of a few pence per hour, whilst during the summer months the same unit will provide a volume of cool air at a running cost of approximately one penny per hour. See page 398

(Continued on next page)

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AIR CONDITIONING

For many years ventilation by mechanical means was regarded as a luxury rather than a necessity, and even when a change in opinion did take place it was considered solely as an aid to the comfort of theatres, etc. The advantage gained, however, was later made use of in many industries where improved conditions were beneficial to those engaged therein, and in every instance an increase in the production and quality was the result. Air is the main support of life itself; therefore essential that we should be supplied with the best quality, and what holds good for us as humans is equally good for the processing of the things we eat. Humans are equipped to overcome the effects of vitiation of the atmosphere to some degree at least, but our products are not, and the effect of high temperatures and high humidity or generally poor air conditions has a great deal to do with the quality of products and their keeping properties. This company has specialised in the supply of better air conditions and is now producing units and large plants for conditioning and distributing air for every branch of industry.

MALLEYS "ALL RED" MULTIVANE FAN RUNNER

The ordinary drum type of Fan Runner is fairly efficient, but its great fault for high efficiency is its uneven distribution of the air. The air entering the intake of the Fan is carried to the back of the wheel, which it strikes with some force, then rebounds against the entering air, then the air passes through the fan blades in a confused mass near the rear of the drum, leaving the front portion of the drum part churning the air and wasting power.

The Malley All Red Fan is designed so as to receive the air without shock and to pass through blades without undue alteration of its speed or direction, also so that the inner edges of blades advance to meet the air in an almost tangential direction to the path of rotation, and the blades are so curved as to guide the air in the direction of the outlet.

The diameter over the outer edges of the blades increases from the back plate to the inlet side, so that centrifugal force increases and compensates for the shorter distance in which the air has to turn through a right angle, such action must give an even distribution of air over the breadth of the wheel.

Owing to the size and shape of the blades and shape of the cone, together with its back plate, the All Red Runner is the strongest and most rigid of all Fans, and does not vibrate or pulsate at any speeds as given in Capacity Tables which follow.

The housings are constructed in sheet steel of ample gauge and are rigidly braced with strong angle-iron framing.

(Continued on next page)

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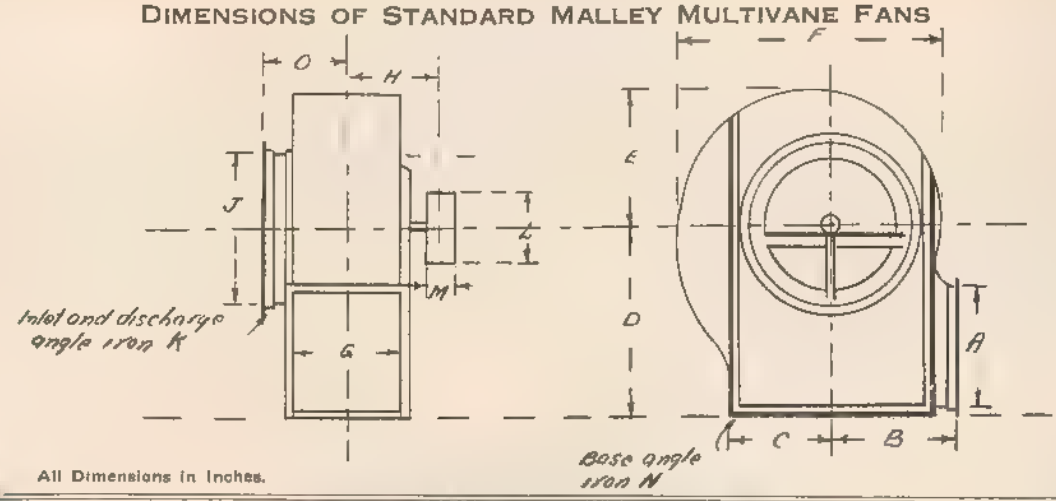
DIMENSIONS OF STANDARD MALLEY MULTIVANE FANS



All Dimensions in Inches.

Fan No.	A	B	C	D	E	F	G	H	J	K	L	M	N	O	Shaft Diam.
1	4½	4	5½	8½	5⅝	9⅞	4	6⅝	6	1 x ⅛	2⅜	1¾	1 x ⅛	4	⅞
1½	6⅞	6	7	11⅝	8 1/16	14⅝	6	8	9	1 x ⅛	3⅞	2¼	1 x ⅛	5	⅞
2	9	8	8½	15	11¼	19½	8	9	12	1 x ⅛	5	3	1 x ⅛	6	1
2½	11½	10	11	19½	14	24¼	10	11	15	1½ x 3/16	7	3	1½ x 3/16	8	1¼
3	13½	12	12½	22¾	17	29¼	12	12	18	1½ x 3/16	8	3½	1½ x 3/16	9	1½
3½	15¾	14	14	25⅝	20	34½	14	13	21	1½ x 3/16	9	3½	1½ x 3/16	10	1½
4	18	16	15½	29	22½	39	16	14	24	1½ x 3/16	10	4	1½ x 3/16	11	1½
4½	20½	18	17½	32⅝	25	43⅞	18	15	27	1¾ x ¼	12	4½	1¾ x ¼	13	1¾
5	22½	23	19½	36¼	28	48⅞	20	17	30	2 x ¼	13	5	2 x ¼	15	1⅞
6	27	27	22½	43	33⅞	58½	24	20	36	2 x ¼	15	6	2 x ¼	18	2
7	31½	31	26	50¼	39	68¼	28	23	42	2 x ¼	18	7	2½ x 5/16	21	2¼
8	36	35	29	58½	46½	81	32	26	48	2 x ¼	20	8	2½ x 5/16	24	2½
9	40½	40	32½	65¾	52	90⅞	36	28	54	2 x ¼	23	9	3 x 5/16	27	2¾
10	45	44	35½	72½	58	100½	40	30	60	2 x ¼	25	10	3 x 5/16	30	3
11	49½	49	38½	79¼	63	110¼	44	33	66	2 x ¼	28	11	3 x 5/16	33	3¼
12	54	53	41½	95	69	120	48	36	72	2 x ¼	30	12	3 x 5/16	36	3½

PERFORMANCE TABLE OF "ALL RED" MULTIVANE FANS

The following are calculated on velocities necessary to produce static water gauge, i.e., the pressure necessary to overcome the resistance in the air system to which the fan is applied. In comparing "All Red" Fans with fans of other makes, special care should be taken, as some manufacturers rate their fans on a total water gauge which is approximately 50 per cent. higher for a given output and B.H.P., and so misleading. Horse-powers shown in columns are, first, the nett B.H.P. necessary to move the given volume of air at the stated pressures, so when installing the prime mover, allowances must be made to cover drive losses. For double width fans, figures in tables below are doubled

Water Gauge.	R.P.M.	C.F.M.	B.H.P.	R.P.M.	C.F.M.	B.H.P.	R.P.M.	C.F.M.	B.H.P.	R.P.M.	C.F.M.	B.H.P.
	FAN No. 1			FAN No. 1½			FAN No. 2			FAN No. 2½		
½	1,700	245	.033	1,174	575	.09	885	1,000	.16	705	1,540	.27
1	2,540	360	.098	1,685	850	.25	1,270	1,450	.48	1,010	2,265	.71
1½	3,115	450	.181	2,[illegible]6	1,050	.48	1,560	1,780	.81	1,240	2,740	1.3
2	3,615	500	.31	[illegible]	1,200	.69	1,800	2,060	[illegible]	[illegible]	3,[illegible]55	1.84
2½	[illegible]	550	.4	2,710	1,300	.98	2,000	2,240	1.7	[illegible]	3,460	2.5
3	[illegible]	600	.56	2,912	1,425	1.31	2,1[illegible]	2,460	2.2	[illegible]	3,805	3.3
	FAN No. 3			FAN No. 3½			FAN No. 4			FAN No. 4½		
½	585	2,[illegible]99	.37	[illegible]	3,000	.52	460	3,975	.6	370	5,000	.8
1	840	3,325	.98	720	4,350	1.3	630	5,780	1.7	[illegible]	8,075	2.3
1½	1,030	4,[illegible]75	1.83	885	5,320	2.4	775	7,065	3.2	[illegible]	11,000	4.5
2	1,[illegible]	4,720	2.75	1,026	6,190	3.7	900	8,225	4.6	7[illegible]0	12,500	5.75
2½	1,[illegible]	5,120	3.61	135	6,710	4.8	9[illegible]5	8,940	6.4	795	13,750	9
3	1,460	5,625	4.61	1,24[illegible]	7,390	6.5	1,090	9,810	8.5	870	15,000	12
	FAN No. 5			FAN No. 6			FAN No. 7			FAN No. 8		
½	395	8,750	1.25	250	9,700	1.36	2[illegible]0	14,000	2.32	195	20,3[illegible]0	2.9
1	42[illegible]	11,[illegible]0	3.[illegible]	3[illegible]0	15,3[illegible]0	5.[illegible]	3[illegible]5	20,500	[illegible].6	280	27,100	7.6
1½	[illegible]20	12,[illegible]85	[illegible].3	440	[illegible]	10.9	585	25,250	13.3	315	33,[illegible]50	13.78
2	[illegible]00	14,760	9.75	513	21,700	14.3	450	29,1[illegible]0	16.5	[illegible]	38,600	21.4
2½	660	16,000	11	[illegible]7	24,0[illegible]	16.5	195	31,800	22.5	440	42,100	29.4
3	720	18,250	15.1	[illegible]2	[illegible]0,500	22.5	545	35,200	29.25	48[illegible]	46,150	38.25
	FAN No. 9			FAN No. 10.			FAN No. 11.			FAN No. 12.		
½	175	23,500	3.18	160	28,500	4.16	146	32,250	4.5	143	46,500	6.25
1	255	34,250	9.6	230	42,500	11.4	210	46,775	12.81	205	64,300	18
1½	310	42,100	17.3	280	52,000	21.3	258	57,700	23.9	250	79,100	33
2	360	50,620	28.25	325	60,100	33.4	300	67,100	37.6	294	93,400	50
2½	400	53,000	37.3	360	65,750	46.3	330	73,000	51.25	323	99,100	67.5
3	440	58,500	49.15	395	72,500	60.2	363	80,000	67.6	352	108,900	88.2

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

CAPACITY TABLES OF "MALLEY" STANDARD EXHAUSTER FANS

The capacity tables are calculated from tests carried out over the large number of fans constructed by us during the past 20 years. Two output values are shown for each fan, with speed and power characteristics for a wide range of resistances for our standard fans.

Each fan enquiry and order is specially investigated by our technical staff, and the fan blade curvature is varied to provide maximum efficiency at the specified conditions.

FAN.			1in. W.G.		2in. W.G.		3in. W.G.		4in W G		5in. W.G.		6in. W.G.		8in. W G.		10in. W.G.	
No.	Size Inlet. Ins.	Output Cu. Ft. Per Min.	RPM.	BHP.	RPM	BHP.	RPM.	BHP.	RPM	BHP	RPM.	BHP.	RPM.	BHP.	RPM.	BHP.	RPM.	BHP.
25	11	805 1,610	962	.26	1,278 1,506	48 1 23	1,550 1,733	.79 1 68	1 768 1 910	1 04 2 .4	2,078	2.42	2,248	2.90	2,552	3.87	2,828	4 87
30	13	1,106 2,212	770	.34	1,023 1,205	66 1.64	1,241 1,385	1 08 2.3	1,412 1,527	1 43 2.81	1,661	3.32	1,795	3.98	2,043	5.31	2,257	6.68
35	15	1,498 2,995	668	.47	888 1,046	90 2.22	1,077 1 203	1 46 3.12	1,227 1,327	1 94 3 80	1,444	4 50	1,560	5.40	1,775	7.18	1,963	9.05
40	17	1,936 3,872	593	.61	787 926	1 16 2.87	954 1,065	1.89 4 08	1 086 1,176	2.50 4 90	1,278	5.81	1,383	6.97	1,573	9.30	1,738	11.7
45	19	2,400 4,800	513	.75	682 803	1.44 3.55	827 922	2.34 5.00	942 1,018	3.11 6 08	1,107	7.20	1,198	8.64	1,363	11.5	1,506	14.5
50	21	2,950 5,900	467	.92	618 728	1.77 4.37	752 839	2.88 6.13	856 925	3.82 7 48	1,007	8.85	1,087	10.6	1,237	14.2	1,367	17.8
55	23	3,538 7,075	427	1.10	567 668	2 12 5 23	688 769	3.39 7.35	785 848	4 58 8.98	923	10.6	988	12.7	1,136	17.0	1,255	21.3
60	25	4,188 8,376	385	1.30	511 602	2 51 6 18	618 692	4.08 8.70	706 763	5 42 10 6	829	12.6	898	15.1	1,020	20.3	1,127	25.3
70	29	5,625 11,250	335	1.75	443 523	3 37 8 32	538 603	5.50 11.7	614 665	7 28 14 3	723	16.8	781	20.3	888	27.0	983	34 0
80	33	7,275 14,550	296	2.27	393 463	4 36 10 8	477 533	7.10 15 1	543 588	9.43 18.4	638	21.8	691	26.2	783	34.9	868	43.8
90	37	8,880 17,776	257	2.77	340 402	5.33 13 3	413 462	8.66 18 5	472 508	11 5 22.5	554	26.6	598	32.0	680	43.6	753	53.6
100	41	11,250 22,500	233	3.50	310 365	6.75 16 6	375 419	11 0 23 4	428 462	14 6 28.5	503	33.8	543	40.6	618	54.0	683	67 9

MALLEY'S NARROW WIDTH EXHAUST FANS

Malley's narrow-width Exhaust Fans have been designed to meet the demand for small capacity heavy duty Fans

The Casings and Runners are solidly built of steel and special care is taken in balancing the Runners.
Spindles are mounted in ball bearings

DIMENSIONS.

No.	Inlet Dia. Inches.	Outlet. Inches.	Pulley. Diameter. Inches.	Pulley. Face. Inches.	Shaft. Diameter Inches.
5	5	4⅞ Square	3	3	¾
6	6	5⅝ Square	4	3	¾
7	7	7¼ Square	5	4	1
8	8	7¾ Square	6	5	1
9	9	8¼ Square	6	5	1

CAPACITY TABLE

No.	½-ounce (.87 inches) R.P.M.	Capacity Cu Ft. Per Min.	H.P.	1-ounce (1.74 inches) R P.M.	Capacity Cu Ft. Per Min.	H P	2-ounce (3.5 inches) R.P.M.	Capacity Cu Ft. Per Min.	H.P
5	1 650	104	024	2,386	149	.074	3,390	209	.223
6	1,400	260	.059	1,972	371	.187	2,803	530	.591
7	960	430	.090	1,381	6.9	309	1,962	887	982
8	863	675	.126	1,214	820	412	1,728	1 171	1 300
9	772	830	.173	1,087	1 182	593	1,551	1 687	1 871

No.	3-ounce (5 2 inches) R.P.M.	Capacity Cu Ft. Per Min.	H P	4-ounce (6 9 inches) R.P M.	Capacity Cu Ft. Per Min	H P	6-ounce (10 4 inches) R P M.	Capacity Cu Ft. Per Min	H P
5	4,159	257	.381	-			—		
6	3,437	650	962	3,971	760	1 37	4,430	1,549	3 85
7	2,415	1,090	1 615	2,790	1,260	2 30	3,013	2,050	5 11
8	2,114	1,439	2 132	2,450	1,653	3 02	2,719	2,942	7.36
9	1,910	2,089	3 07	3,211	2,591	4 26			

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MALLEY PLANING MILL OR EXHAUSTER FANS

DIMENSIONS OF SINGLE FANS.

Number of Fan.	Diameter Round Pipe to Fit over Inlet and Outlet.	Diameter of Wheel.	Pulley.		Diameter of Shaft.	Extreme Dimensions for Bottom Horizontal Discharge Fans.			Weight of Standard Fan in Pounds
			Diameter.	Face.		Length.	Width.	Height.	
	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	
[illegible]	11	16	5	4½	1¼	25¾	31¼	27½	265
30	13	20	6	5½	1⅜	30½	36½	32½	390
35	15	23	7	6½	1½	34½	38½	37	480
40	17	26	8	7½	1⅝	39¼	45¼	41½	685
45	19	30	9	8½	2	43¾	49½	46½	900
50	21	33	10	9½	2	48¼	52½	51	1,050
55	23	36	11	10½	2¼	53½	58¼	56	1,350
60	25	40	12	11½	2¼	57½	61½	61	1,800
70	29	46	14	12½	2½	66¼	68½	70½	2,600
80	33	53	16	14½	3	75	75½	79¾	3,415
90	37	60	18	14½	3½	83¼	78¾	83	4,450
100	41	66	20	16½	3½	92½	80¼	92½	6,250

Ring Type Propeller Fan with Motor.

MALLEY PROPELLER FANS

Supplied to meet all conditions, direct-coupled to motors, fitted with belt pulleys or arranged for gear or silent chain drive, may be fitted with bedplate or ring with wall brackets to suit local conditions

MALLEY DIRECT CONNECTED PROPELLER FAN

Economical of power. Where conditions permit of a choice between a propeller type and a volumetric type of fan, the following rules are useful:—

1.—For open ventilation use "Malley" Propeller Fans.

2.—Make the air duct the same diameter as fan or larger, avoiding obstructions or acute angle bends.

3.—When sharp bends and small ducts are unavoidable, use "Malley" Volumetric fans.

4.—Use large fans at low speeds and save power

APPROXIMATE CAPACITIES OF MALLEYS PROPELLER FANS

12-INCH DIAMETER BLADES			18 INCH DIAMETER BLADES		
R.P.M.	C.F.M.	B.H.P.	R.P.M.	C.F.M.	B.H.P.
3,000	3,000	.55	3,000	7,[illegible]	1.2
2,300	2,500	.34	2,500	5,5[illegible]	.7
2,000	2,000	.2	2,000	4,500	.35
1,440	1,500	.08	1,440	3,300	.15
960	980	.05	960	2,2[illegible]0	[illegible]

24-INCH DIAMETER BLADES			30-INCH DIAMETER BLADES			36-INCH DIAMETER BLADES		
R.P.M.	C.F.M.	B.H.P.	R.P.M.	C.F.M.	B.H.P.	R.P.M.	C.F.M.	B.H.P.
2,0[illegible]	9,50[illegible]	[illegible]	1[illegible]	[illegible]	[illegible]	96[illegible]	[illegible]	1.95
1,2[illegible]	6,8[illegible]	[illegible]	94[illegible]	[illegible]	[illegible]	7[illegible]	14,0[illegible]	.8
940	[illegible]	[illegible]	72[illegible]	7,5[illegible]	2[illegible]	560	1,0[illegible]	.33
7[illegible]	3,4[illegible]	1	5[illegible]	[illegible]	.5	[illegible]	7,5[illegible]	.25

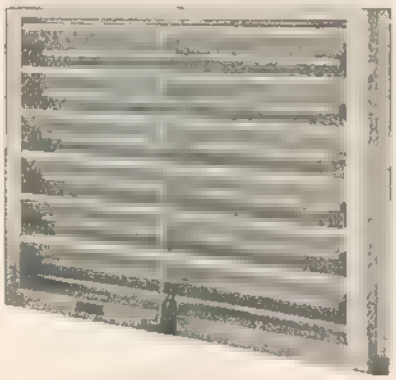
MALLEY'S AUTOMATIC OR ADJUSTABLE LOUVRES

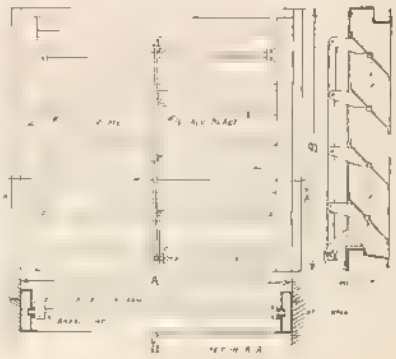
These high-grade Louvres are installed to ensure adequate fresh air supply in connection with any heating and ventilating system in schools, power plants, public buildings, transformer vaults, etc

Advantages

Easy to operate, absolutely foolproof. Practically indestructable, absolutely stormproof and weatherproof Blades do not protrude when Louvre is open. Can be installed in series of two or more units to fit any size opening.

Blades can be removed entirely in case of emergency. Furnished with bird wire if required. Reasonably priced, considering the high-grade material and workmanship





Construction Features

Malley's Louvres—Operated by Hand Lever.

(Continued on next page)

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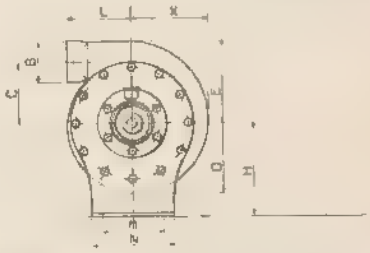
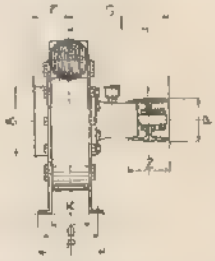
MALLEY "ALL RED" STEEL PLATE BLOWERS

Cast Iron Blower

THE ALL-RED BLOWERS ARE FITTED WITH BALL BEARINGS AND ARE PROVIDED WITH THE NECESSARY PROTECTION AND GREASE SPACE TO ATTEND TO ALL LUBRICATION FOR TWO YEARS OR MORE UNDER NORMAL CONDITIONS.

THE RUNNER IS OF THE MULTIVANE TYPE





ENSURING HIGH EFFICIENCY WITH MEDIUM SPEEDS

Fan No	A	B	C	D	E	F	G	H	I	K	L	M	N	O	P	Po	N	Z
00	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

PERFORMANCE TABLES — STEEL PLATE BLOWERS

C.F.M.	Ozs.	Ins.	B.H.P.	R.P.M.
		NO. 0		
[illegible]		[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
		NO. 1		
400	1	[illegible]	[illegible]	[illegible]
550		[illegible]	[illegible]	[illegible]
[illegible]		[illegible]	[illegible]	[illegible]
800	[illegible]	[illegible]	[illegible]	[illegible]
900		[illegible]	[illegible]	[illegible]
1,000	[illegible]	[illegible]	[illegible]	[illegible]
		NO. 2		
900	1	[illegible]	[illegible]	[illegible]
1,300		[illegible]	[illegible]	[illegible]
1,700		[illegible]	[illegible]	[illegible]
1,900		[illegible]	[illegible]	[illegible]
2,200	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2,600	[illegible]	[illegible]	[illegible]	[illegible]

All of the above tables are calculated on velocities necessary to produce static water gauge [illegible] the pressure necessary to overcome the resistance in the air system to which the fan is applied. In comparing "All Red" Fans with fans of other makes, special care should be taken, as some manufacturers rate their fans on a total water gauge which is approximately

C.F.M.	Ozs.	Ins.	B.H.P.	R.P.M.
		NO. 3		
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	2,275
2,68[illegible]	[illegible]	[illegible]	[illegible]	2,640
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3,175	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	240
		NO. 4		
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
		NO. 5		
[illegible]		[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
5,650	[illegible]	[illegible]	[illegible]	[illegible]

[illegible] for a given output and B.H.P. and so mechanical [illegible] horse powers shown in above columns are, first the net B.H.P. necessary to move the given volume of air at the stated pressures so when installing the prime mover, allowances must be made to cover drive losses.

(Continued on next page)

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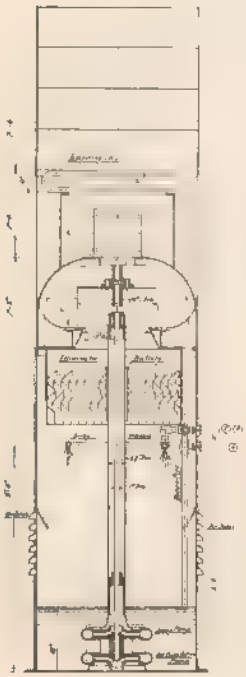
MALLEYS UNIT AIR CONDITIONER

AS APPLIED TO AIR CONDITIONING IN FACTORIES



LABORATORIES

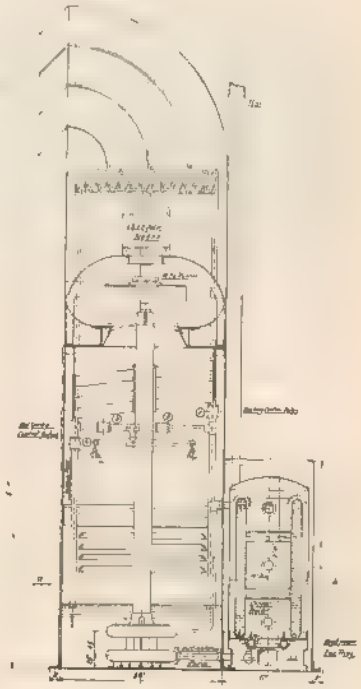
SHOPS

OFFICES

HOTELS

RESTAURANTS

GIVING A CONTROLLED CIRCULATION OF AIR SUITABLE FOR ANY AND EVERY NEED



MANUFACTURERS SPECIFICATION OF MALLEYS UNIT CONDITIONER

Capacity.—3,000 cubic feet per minute, temperature rise 15 deg. fah. adjustable, electric power consumption 1d. per hour, gas consumption 80-90 cubic feet per hour, housing constructed of 20 gauge Furniture Steel, lined internally in the wet section with sheet copper.

Fan.—Malleys' All Red Multivane, especially designed to meet the requirements.

Boiler.—Solid Copper cross tube return flue type constructed by Malleys Ltd.

Pumps.—One accelerator and one spray—designed for the job and constructed throughout of gunmetal. These are so arranged as to be fully submerged at all times, so obviating leaking glands, air locks, etc.

Sprays.—Gunmetal Centrifugal type with free open outlets, so by-passing the possibility of blocking from grit, etc.

Eliminators.—Galvanised iron of heavy section, arranged to present any entrained moisture from passing with the air stream.

Tempering Coil of Copper pipe of sufficient length and section to ensure the correct heating surface.

Outlet Louvres.—Fitted to the discharge, and are adjustable for deflecting the discharge air in any desired direction.

Motor.—1 B.H.P. 720 R.P.M., 3 phase. The motor is of the totally enclosed type for protection against any possibility of damage from moisture contact.

Vertical driving shaft fully cased in bronze tube running in sealed ball bearings top and bottom. The vertical drive shaft is machined at the bottom to receive the pump impellers, which are secured to same by means of a cap nut, which excludes all moisture from the shaft.

The top end of shaft is machined taper to receive the fan hub, which forms the bottom half of a flexible coupling, each coupling being secured by a recessed nut.

GENERAL

The wiring to the motor is extended to the outside of the main housing, so facilitating the electrical connection. A four-inch flue pipe extends from the boiler at the immediate rear of the Conditioner housing.

A water connection controlled by a ball cock is fitted to the main washer tank for the purpose of maintaining a constant water level. For extreme cooling effects refrigeration can be added if desirable.

The controls in general are arranged in a convenient position on the side of the unit housing and are such as to provide complete control of the air and water in circulation

The whole of the outside housing will be finished in suitable colours to harmonise with the general surroundings.

WE ALSO DESIGN, CONSTRUCT AND ERECT AIR CONDITIONING PLANTS OF THE CENTRAL STATION TYPES, FOR THEATRES, CHURCHES, PUBLIC BUILDINGS AND TO MEET ALL INDUSTRIAL REQUIREMENTS.

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

SECTION Q (A)

[Containing S.A.A. Filing Section No. 30g]

OIL BURNERS & EQUIPMENT

RAMSAY

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

30g

S.A.A. File No.

COMMONWEALTH OIL REFINERIES LTD.

PROPRIETORS: THE COMMONWEALTH GOVERNMENT AND THE ANGLO-PERSIAN OIL COMPANY LIMITED

Refinery:
KOROROIT CREEK ROAD, WILLIAMSTOWN, VICTORIA

Branch Offices:
VICTORIA Poolman St., Port Melbourne
N.S.W.: 117 Pitt St., Sydney

Selling Agents:
S.A.: Dalgety & Co. Ltd.
QUEENSLAND: Dalgety & Co. Ltd.

C.O.R.

HISTORY AND EXTENT OF HEATING WITH FUEL OIL

It might well be said that the opening of the twentieth century marked the beginning of the "Oil Age." Previously, little was known of the value of oil as a fuel, coal having at that time a monopoly.

Oil is now being used in practically every industry and wherever power is generated. Transport is largely dependent on it, and where efficiency and cleanliness are essential, oil has ousted every other form of fuel.

In their designs for Residential, Commercial and Institutional buildings, Architects are incorporating central heating with oil as a boiler fuel. Increased efficiency, ease of control, freedom from dust and ashes, with a consequent reduction of Fire Risk, and the low cost of upkeep, are among the advantages of the oil fired boiler. Thermostatically controlled, the amount of supervision necessary is reduced to a minimum, and, with the oil burner once set, the plant may be left for hours without attention, with the assurance that the desired temperature will be maintained.

C.O.R. Refinery at Laverton, Victoria

C.O.R. Fuel Oil is obtained by the distillation of a high-grade Persian crude oil, with a paraffin base. It is refined at Laverton, Victoria, the well-known C.O.R. brands of Motor Spirit and Kerosene being produced at the same time. C.O.R. Fuel Oil is suitable for furnace or for engines of the Diesel type.

The Specification is:

Specific Gravity @ 60°F. .897
Flash Point: 175°F
Viscosity @ 75°F., Redwood 195 secs.
Viscosity @ 100°F., Redwood 92 secs.
Viscosity @ 140°F., Redwood 55 secs.
Flow Point. 35°F.
Calorific Value. 19,500 B.T.Us
Asphalt Content: 1.5%.
Sulphur Content: 1.1%

Requirements of Atomization

The success of Oil as a fuel is due to the fact that it is easily atomized and enters the combustion chamber in the form of vapour. The construction of the burner nozzle is such that a whirling movement is given to this vapour as it leaves the burner. This movement aids the mixture of oil and air so necessary to perfect combustion. Atomization is obtained in various ways. With the pressure burner the oil is forced through a fine orifice at from 10 lbs. to 60 lbs. pressure. With the steam burner the oil is forced through the burner orifice by gravity and a jet of steam atomizes the oil after it passes through the burner nozzle. Perfect atomization and the correct air mixture will give perfect combustion.

The absence of smoke at the stack is not evidence of perfect combustion, as it is possible to have smokeless combustion with an over supply of air. Although no smoke is visible, heat is being generated more rapidly than it can be absorbed, and the result is an increase in smoke-stack temperatures with a corresponding loss.

A light grey haze at the stack is evidence that the air supply is economically adjusted.

Table of Comparative Calorific Values of C.O.R. Fuel Oil and Other Fuels

Fuel	Calorific Value B.T.U. per lb.
C.O.R. FUEL OIL	19,500
N.S.W. COAL	12,500
BRIQUETTES	9,000
HARDWOOD (BOX)	8,000
COKE	11,000
COAL GAS	500-600

(Continued on next page)

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Fuel Oil Installation

STRUCTURAL REQUIREMENTS

So small and compact is the modern Fuel Oil Burner Unit, that it is not necessary to make special provision for the housing of the set. The amount of space usually allotted to a coal-fired boiler is more than sufficient to accommodate the unit and leave ample room for inspection and overhaul

ELECTRICAL WORK

The motor which drives the set is usually of ¼ or ½ h.p., according to the size of the unit which it is necessary to install Where thermostatically controlled, the wiring to the switch location will have to be provided for

OIL STORAGE

The oil is stored in underground tanks of from 200 to 5,000 gallon capacity Tanks of 1,500 gallons capacity are very suitable to the average installation, as they do not require frequent filling and the excavation necessary for their reception is comparatively small

FIRE UNDERWRITERS' REGULATIONS FOR STORAGE OF FUEL OIL

The Fire Underwriters' Regulations for the Storage of Fuel Oil must be complied with. These regulations include the following

No liquid having a flashpoint below 150 deg F (closed test) shall be used or mixed with Liquid Fuel"

"Tanks shall be constructed of Wrought Iron or Mild Steel of a minimum gauge as follows

1 to 250	gallons	16 gauge
251 to 500	"	14
501 to 1,000	"	1
[illegible]		7
3,001 to 5,000	"	[illegible] inch

The capacity of any individual tank not to exceed 5,000 gallons

Tanks must be filled from outside the building only through oil tight pipes with screw caps or valves"

"Underground tanks to be covered by earth at least 2 ft. thick, or by earth at least 12 in. thick, with reinforced concrete thereon."

"A vent pipe of at least 1 in. and not exceeding 2 in. diameter carried to the open air and suitably protected by two brass wire diaphragms having not less than 900 meshes to the square inch to be fitted"

"All tanks must be electrically earthed"

Oil Delivery Facilities

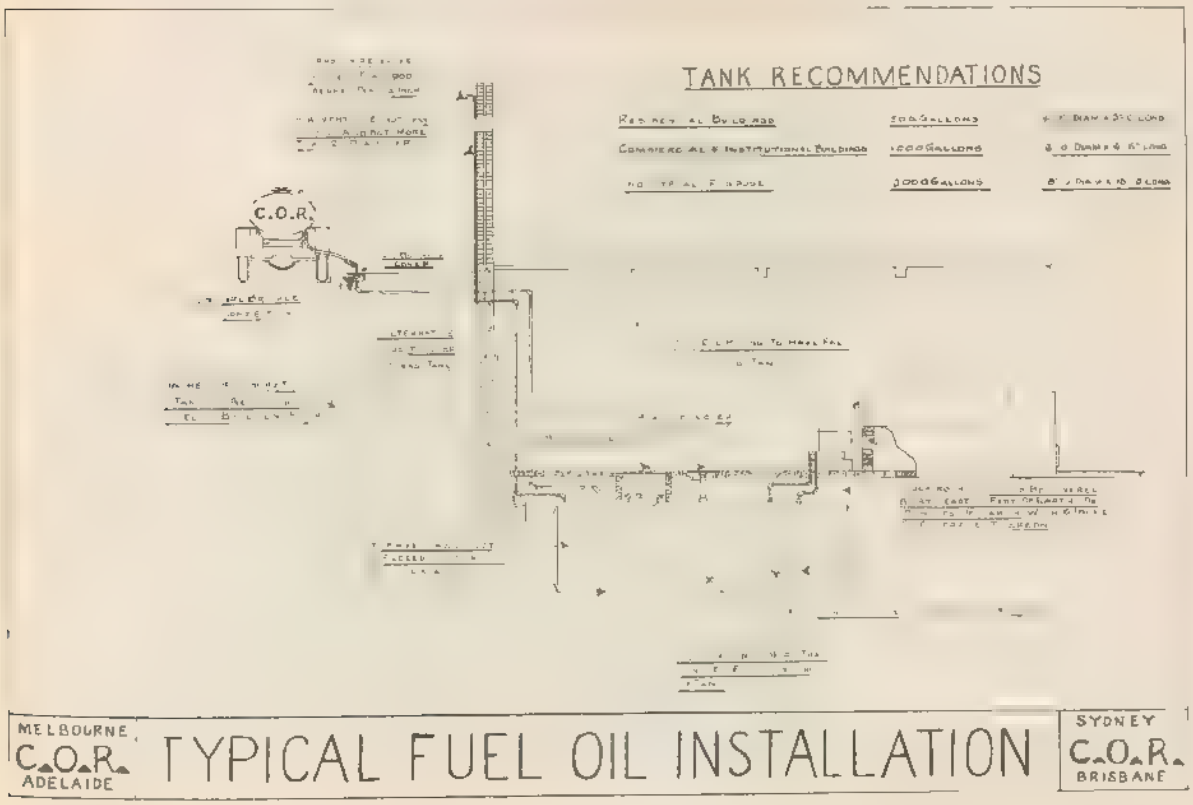
The Commonwealth Oil Refineries Limited have a fleet of well-equipped motor vehicles of 1,000 gallons and 1,500 gallons capacity for the delivery of Fuel Oil. These vehicles are fitted with Power Pumps, so the filling of underground tanks can be carried out speedily and without spillage

Representative Users of C.O.R. Fuel Oil in Melbourne

Capitol Theatre.
Chancery House.
Commercial Travellers Club.
Royal Automobile Club.
A.M.P Society
Equity Trust Building

Advisory Service to Architects

The Commonwealth Oil Refineries Limited will be pleased to place the services of their Fuel Oil expert at the disposal of architects to help to solve the problems of location and layout of Fuel Oil Installations.



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S.A.A. File No.

THE SHELL COMPANY OF AUSTRALIA LTD.

AUSTRALIAN HEAD OFFICE:
Shell Corner, Bourke and William Streets, Melbourne.

NEW ZEALAND HEAD OFFICE:
The Shell Co. of New Zealand Ltd., A.M.P. Buildings, Corner Hunter Street and Custom House Quay, Wellington.

BRANCH OFFICES.
Shell House, North Terrace, Adelaide.
Lawson House, 49 Clarence St., Sydney.
Shell House, Ann Street, Brisbane
Shell House, St. George's Terrace, Perth.
15a Elizabeth St., Hobart.

[For Other Products, See Index]

FUEL OIL FOR CENTRAL HEATING

A New Era in Central Heating

Architects and heating engineers in Australia, in common with other countries, have been quick to recognise the many advantages of oil fuel as applied to central heating plants, and oil firing is now invariably specified for the heating systems of new buildings. In addition, many existing coal and coke fired boilers are being converted to the use of oil.

The Automatic Oil Burner

No alterations are required in the heating system to accommodate oil fuel, since the disposition of the radiators, etc., or of the warm air circulating system, is quite independent of the fuel being used. In addition, the adaptation to oil fuel of a boiler designed to burn solid fuel involves only minor alterations.

The oil burner is a complete and self-contained unit, including a full set of safety controls and a self-ignition device. Its operation is regulated by the action of a conveniently-situated room thermostat, or of a hot water thermostat, so that no attention whatever is required on the part of the operator. The action of this thermostat then controls the output of the boiler, so that the temperature of the building is maintained accurately and definitely at some pre-determined figure, quite irrespective of weather conditions or of the load imposed on the system. (See charts on next page.)

THE ADVANTAGES OF OIL FIRING

Performance

The one essential of any heating system is that it shall maintain a steady and comfortable temperature within the building, and any other consideration must be subservient to this. Oil firing, by reason of its automatic control, is able to do this, and the accompanying thermographs show the very close regulation which can be maintained. Such regulation is quite impossible with solid fuels, particularly in the smaller installations, where the reserve of heat against changes of weather is correspondingly small. Another unsatisfactory feature of solid fuel is that in an effort to combat the chilliness of the morning, the stoker often produces an unpleasant degree of stuffiness later in the day, a condition which is not only unhealthy, but is also wasteful of fuel.

Constant Availability

Owing to the sudden climatic changes in this country, it is often desirable in the spring and autumn to use the central heating system during short spells of cold weather. Because of the difficulties attending the starting up of coal or coke fired boilers, buildings are often left unheated, but oil burners can be put into operation merely by the turning of a small electrical switch, and heat thus provided throughout the building in a very short time.

T. & G. BUILDING, MELBOURNE.
Central-heated with Shell Fuel Oil.

Cleanliness

Oil has been aptly described as "the invisible fuel." Flowing silently through pipes, it can cause no dirt or mess whatever, and its method of delivery, by flexible hose from the road tank waggon, is equally clean. On combustion it burns completely with no trace of smoke or ash. This contrasts strongly with the all-pervading dust and grit associated with solid fuel, and, quite apart from the natural desirability of cleanliness, it leads to an appreciable cash saving in cleaning, boiler and flue cleaning, ash removal, repainting, etc.

Convenience

Started and stopped at will by a small switch, and running with an entire absence of attention, the oil burner is quite definitely the most convenient means of heating. Such convenience is of great importance, particularly in the smaller buildings, and can be regarded as essential in the private house.

Where required, clock switches are available, which will switch on and off at pre-determined times, or they can be so arranged to give the required temperature during the day, but a lower and more economical temperature at night, this latter temperature also being under full control.

(Continued on next page)

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THE ADVANTAGES OF OIL FIRING—(*continued*)

Silence

The modern oil burner is practically noiseless, a feature which is a great advantage in hospitals, schools, hotels, etc., where the clanging of rakes and clinkering tools and the banging of fire doors is so disturbing.

Labour-Saving

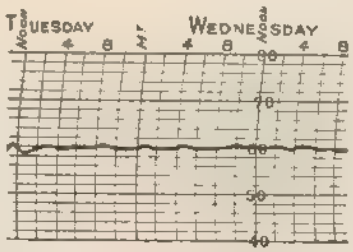
The labour required with oil is nil, so that the saving, as compared with solid fuel for any particular instance, can readily be assessed.

Fuel Economy

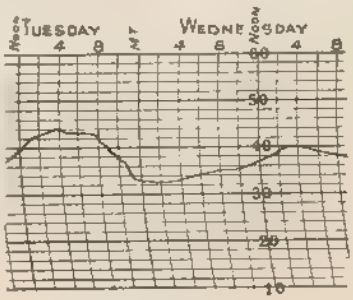
Ton for ton, oil is more expensive than coke, but allowance must be made for the relative calorific values and efficiencies of the two fuels. In calorific value, oil is uniform at 19,000 B.T.U.'s per lb., whereas coke varies between wide limits, though it is usually 10,000 to 11,000 B.T.U.'s.

In efficiency, the oil fired central heating boiler is high, usually 74 per cent. to 78 per cent., since combustion is mechanically regulated to the best conditions. With the coke fired boiler, on the other hand, conditions are irregular and unfavourable, and the efficiency is far lower than is generally realised, 45 per cent. to 50 per cent. being a fair average. In addition, the coke boiler supplies a certain proportion of heat unnecessarily, due to its poor regulation.

Taking the above items into account, it is found in the average case that the cost of oil, on a basis of the heat actually required, is about the same as that of coke, or perhaps slightly less, though in some instances very considerable savings have been shown. This is quite apart from labour and other savings.



TEMPERATURE INSIDE BUILDING



TEMPERATURE OUTSIDE BUILDING

Thermographic records in a building fitted with oil-fired Central Heating having thermostatic control.

Economy of Space

One of the greatest points in favour of oil fuel when a new building is under construction is the very economical lay-out of the basement which becomes possible by its use. Since the storage tank can be underground, and since, apart from a few small pipes, no facilities are required for delivering and handling and none for ash removal, the architect has a very free hand and can arrange the basement lay-out so as to obtain the most efficient use of every foot of space.

Semi-Automatic and Hand-Controlled Burners

For large buildings where an attendant must, in any case, be on duty, semi-automatic or hand-controlled burners are sometimes more suitable than the fully automatic burners referred to above.

In the case of a semi-automatic burner, ignition is by hand, but, apart from that, the burner functions unattended, while with the hand control the flame is regulated by the adjustment of a small valve.

With the exception of the small amount of attention needed, these burners give all the advantages of the fully automatic type.

Fuel Oil Burners applied to standard ranges at Clivoden Mansions, East Melbourne.

Cooking

All the advantages of oil fuel for central heating, particularly those of heat control and cleanliness, are found in its application to cooking. In addition, it is usually found that a very considerable cash saving can be made on the fuel cost, and, due to the accurate heat control which is possible, the quality of the product is greatly improved. Large hotels and restaurants are changing over to the use of oil in ever increasing numbers.

Diesel Engines for Stand-by Purposes

As a standby against the failure of the outside source of electric supply, the diesel engine is unequalled. The space occupied is small, the the engine operates on the same Shell Fuel which is supplied for central heating and cooking, so that no separate storage tank is necessary. It is always available, and can be started up and put on load within a few seconds. In scores of Australian buildings, diesel engines have fully justified their installation for this purpose.

SHELL SERVICE

The above summary is necessarily of a general nature and does not attempt to enter into detail. The Shell Company, however, maintains a staff of highly qualified engineers for the purpose of advising interested parties, and full particulars relating to delivery, handling, storage or the use of oil for any purpose will gladly be given on request.

The Shell Company does not manufacture and has no interest in the manufacture of any burner, so that an unbiased opinion can be given. Arrangements can be made to inspect existing plants on application to the Fuel Oil Department of the nearest Branch Office.

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30g

S. V. C. F. D. No.

AUTOMATIC HEATING APPLIANCES
PTY. LTD.

TEMPLE COURT, MELBOURNE, C.1

Interstate Representatives

NEW SOUTH WALES: ("Oil-O-Matic"), J. Sainsbury & Co., Grose Street, CAMPERDOWN.
" " ("Enterprise"), James Anderson, 2A Edward Street, CHIPPENDALE
QUEENSLAND: J. R. Wyllie & Sons Ltd., Albion, BRISBANE
SOUTH AUSTRALIA: Wm. Begg & Son, Charles Street, ADELAIDE.
WESTERN AUSTRALIA: Flowers, Davies & Johnson Ltd., 413-417 Murray Street, PERTH.

OIL -O- MATIC — ENTERPRISE

Products

The following products are supplied by this firm —
- Williams' Oil-O-Matic Oil Burners in various models for residences and buildings
- Williams' Ice-O-Matic Electrical Refrigerator for homes and small commercial installations
- Enterprise Rotary Oil Burners
- Powers' Automatic Temperature Controlling Systems, Thermostatic Regulators, Humidity Control Devices, Thermostats Water Controllers, Shower Bath Mixing Valves.
- Excelso Indirect Water Heaters
- McAlear Water Feeders and Controllers, Liquid Level Controllers
- Hydrolator Motor-driven Centrifugal Pump Units

Function and Service

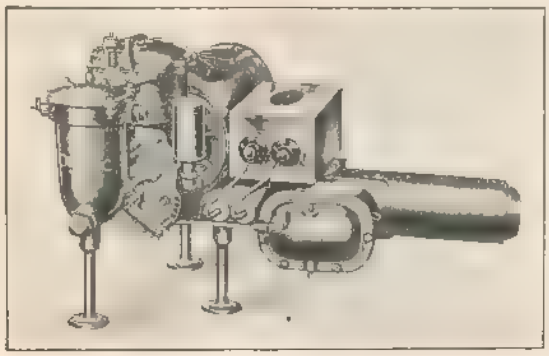
The function of this firm and associated representatives is to make available to the Architect, Engineer, or others a complete line of world-wide approved automatic appliances designed for the express purpose of effectively heating atmosphere or liquids without having to resort to past methods of manual operations. We are prepared to discuss with Architect or Engineer all such heating problems with a view to submitting either advice or a definite quotation for a single item or a group of inter related, fully automatic appliances to harmoniously, safely and efficiently provide a specific heating service.

Ample literature, supplementary to the data on these pages, is available on application.

WILLIAMS' OIL-O-MATIC BURNERS
(Made in Australia under License)

Application of Automatic Oil Heating

With assurance of satisfaction to your client, you may safely specify automatic oil heating for any purpose where a constant, accurate temperature is desired. Thermostatic control prevents fuel waste. The boiler or furnace operates at peak efficiency for only such periods of time as are necessary to replace heat losses. When such losses are replaced, the heat is automatically turned off. When the total cost of operating a hand fired coal boiler is considered, very often oil heating indicates a decided economy.



The new Oil-O-Matic Model K for smaller installations. The Diffusor is shown on the right side.

Oil-O-Matic Burner

Williams' Oil-O-Matic is designed and approved by Underwriters' Laboratory Inc., to burn Shell or C.O.R. Fuel Oil. The Oil-O-Matic may be checked against the four accepted principles of successful fuel oil burning as follows:—

1. **"The oil must be atomised, not vapourised."** Oil-O-Matic conforms to this principle as the oil is atomised as it enters the combustion chamber.

2. **"The oil must be burned in suspension, that is, before it comes in contact with any surface."** Oil-O-Matic conforms to this principle because it is discharged at the nozzle into the combustion chamber, where it burns in suspension.

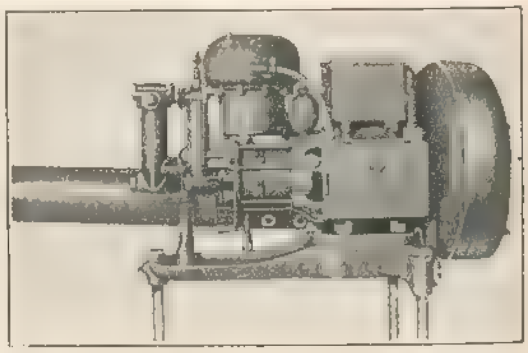
3. **"The oil must be burned in the presence of a refractory material."** Oil-O-Matic complies with this principle as the combustion chamber is lined with firebrick or other refractory material. As the firebrick reaches a high temperature it reflects all heat back into the combustion zone. This radiant heat assures complete combustion.

4. **"A minimum quantity of air must be positively supplied for combustion and mixed mechanically with the atomised oil."** Oil-O-Matic complied with this requirement, as the fan delivers a specific quantity of air which is positively mixed with the atomised oil in the combustion chamber.

The Williams Oil-O-Matic burner not only complies with every fundamental principle of correct oil burning, but, in addition, the metering device guarantees a constant and uniform feed through the widest possible range of variations in viscosity of the oil.

MODELS—CAPACITIES AND DIMENSIONS.

Williams Oil O Matic Burner	Oil Capacity, Imp. Gallons Per Hour.		Overall Dimensions.		
	Min.	Max.	Length	Width	Height (Min.)
Model JJ	8	14	50	33	22
Model J 1,800	4	10	46	16	15½
Model J 1,200 ⅜in. pump	1	5½	46	16	15½
Model J 1,200-¾in. pump	1	4	46	16	15½
Model K	½	3	34	32	18



The World-famous Oil-O-Matic Model J, which is heating more than 100,000 jobs in 44 countries.

IGNITION.

Oil O Matic requires no continuous low flame, pilot light, or continuous electric spark for dependable operation. The ignition is automatically turned on when a room thermostat indicates that heat is needed. This ignition operates for only a fraction of a minute until the atomised oil is fully ignited. Then the ignition is automatically turned off until needed again. Should the burner fail to function, for lack of fuel or any other reason, approved safety controls turn off the ignition, stop the burner and shut off the oil supply.

(Continued on next page)

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Control

The Oil-O-Matic is completely automatically controlled. The master control is an instrument known as a thermostat, generally placed in a central room of the house. The sensitive thermostatic mechanism responds to temperature changes, and switch mechanism is then actuated, resulting in the stopping and starting of the oil burner

Safety devices and limit controls are regularly supplied with installations, ensuring efficient operation and eliminating any personal element from interfering in its operation

New Diffuser

The Diffusor is a recent and important Williams Oil-O-Matic refinement. Its function is to steady the oil flow, so that it is delivered at the nozzle with almost a total absence of the flutter and fluctuation which is a common source of sound when an oil burner is in operation Diffusor standard with all models.

Installation

"No oil burner is any better than its [illegible] The proper installation of a Williams Oil-O-Matic burner will ensure its satisfactory operation, and this work can best be done by an authorised dealer, or by a heating engineer under our supervision. (See list on page 363.)

Installation of Oil-O-Matic Burners in a large Melbourne Building

REPRESENTATIVE INSTALLATIONS.

Victoria—
- Shell Building.
- Railway Offices Building
- Temple Court.
- A.M.P. Society Building
- National Bank.
- State Theatre.
- Town Hall.
- T. & G. Building.
- Newspaper House.

New South Wales—
- State Savings Bank
- Hotel Metropole
- B.M.A. Building.
- Tattersall's Club
- Government Offices, Canberra
- Hotel Kosciusko

South Australia
- Railway Station Buildings.
- State Savings Bank
- Shell Building
- Tattersall's Club.
- Nutrition Laboratory
- Hotel Richmond

Queensland—
- Canberra Hotel.
- Ipswich Hospital.
- Commercial Bank
- Craigston Flats

Western Australia—
- Chennel House.
- Mental Hospital.
- Great Southern Flour Mill.

ENTERPRISE OIL BURNER

(Made in Australia under License)

Use

Enterprise Oil Burners are adaptable for most any problem where heat is required. They have proven their performance on ranges as well as on big power boilers, small home heating furnaces, or big rotary kilns.

Description and Operation

Made in two types Type E for Industrial, and Type A for Automatic burners. They are operated by an electric motor, mounted on same shaft with fan, one single, compact unit, producing necessary air for atomising and burning oil. Hinged either on a furnace plate or on a refractory tile-lined door, giving easy access to furnace at any time.

Fuel oil is supplied from an outside storage tank and brought in through the burner hinges, either fed by gravity or drawn in by a small oil pump, driven by a worm and gear off the burner shaft. The oil enters at rear into the shaft and later into atomising cup, where it is thrown off in a fine mist by centrifugal force of 3,500 r.p.m., and forced into the firebox by air blast from the burner fan, producing a very hot, soft and smokeless flame. Motor is entirely enclosed, dustproof, and cooled by the suction air from the burner fan. Air and oil supply regulated manually or automatically from boiler controls giving high efficiency and close regulation for any boiler load.

Installation of Enterprise Burners in a Large Departmental Store, Melbourne.

Types and Sizes

Type A—Controlled by a thermostat for heat or an aquastat for hot water Burns cheapest grade of fuel without smoke or carbon Installation is simple and can be made in a few hours regardless of the type of boiler, heater or furnace Automatic burners are furnished with gas ignition.

Type E—Made in all sizes. Suitable for any type of heating problem, furnished either in the pump or pressure type, burns any oil which can be pumped, regulated either manually or automatically on low and high pressure boilers. Can be installed either singly or in batteries, made either right or left hand swing, easy to operate, flexible in load variations, giving highest efficiency and requiring very little attention. Burner is equipped with Westinghouse alternating-current 60-cycle motors in single or polyphase, also burners with direct current motors furnished on request.

Representative Installations

Children's Hospital, Frankston, Vic.
Monsanto Southern Cross Chem. Co
G. J. Coles & Co. Pty. Ltd., Melb.
Australian Club, Melbourne.
New Shell Building

CAPACITIES OF BURNERS.

Burner Size	AA	A	B	C	D	E	F	G	H	J	K
Imp. Gals. per hour	[illegible]	1 [illegible]	2 [illegible]	1	5 14	[illegible]	8-25	[illegible] 28	[illegible]	20 38	30 72
Motor H.P.	[illegible]	[illegible]	[illegible]	[illegible]	5	6	1	1	1½	2	3

For D.C. current add 1/6th to above capacities.

(Continued on next page)

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S.A.A. File N

BERTRAM & BELL

Engineers and Contractors

499 LITTLE COLLINS STREET, MELBOURNE

TELEPHONE F 6049

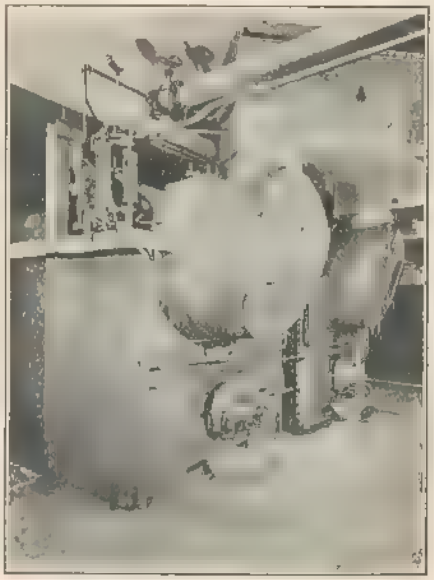
OIL BURNERS

Products

"Bertram" Commercial and Domestic Oil Burners
"Bertram" Industrial Oil Burners,
Low-Pressure, High Pressure & Rotary Types.
"Bertram" Industrial Furnaces
"Tramel" Filters for Steam, Oil or Liquids.

(at left) Close-up view of the "Bertram" Automatic Oil Burner.

(at right) Two "Bertram" Automatic Burners recently installed in the Manchester Unity Building, Melbourne.



The "Bertram" Automatic Oil Burner

The "Bertram" Automatic Oil Burner is a complete oil burning unit combining Motor, Fan, Oil Pump and Atomiser, completely synchronised and controlled, and compactly mounted as an integral unit, mounted by means of a hinged connection to a cast iron front plate which is bolted to the boiler.

The oil is delivered inside an improved type of atomising cup, positively driven at a very high velocity, and is thrown off the rim of this cup by centrifugal force in the form of a fine mist. Here the blast of air from the fan, controlled by the special nozzle, meets this oil mist and completes a perfect mixture of air and finely atomised oil. This is one reason for this Burner's remarkable efficiency.

"Bertram" Automatic Oil Burners are designed to burn the grades of fuel oil available here in commercial and industrial installations. They burn the lowest and cheapest grades of fuel.

Control of Primary Air, Secondary Air and Oil are synchronised for any desired operation.

The Control Gear includes Safety Switches that render it impossible for the Burner to operate under any hazardous conditions and are self-protecting against failure of any component.

The Burner lights itself either by expanding gas pilot, gas electrically ignited, or straight electric ignition. It burns oil only when more heat is required and shuts itself off when the demand has been filled.

The trouble free dependability of these Burners is proved by the fact that this Firm holds the keys of several Boiler Rooms, the Owners having no need to visit the same.

Models and Capacities

(Based on Normal Draft Conditions).

Model.	Motor H.P.	Capacity Galls. oil per hour.	H.P. Rating.	Sq. Ft. Hot Water Radiation.
1	¼	½—3	12	25 - 1,950 sq. ft.
2	¼	1—6	24	650 - 3,900 sq. ft.
3	½	3—15	60	1,95 - 9,750 sq. ft.
4	¾	10—25	100	6,50 - 16,250 sq. ft.

Furnished for all current specifications.
Prices on request.

Recent Installations of Automatic Burners

C.S. & I.R., Canberra	1 burner
Port Authority Building, Melbourne	4 burners.
Manchester Unity Building, Melbourne	2 burners.
State Electricity Commission, Yallourn	1 burner
Commonwealth Note Printing Building	3 burners.
K. F. Coles (residence)	1 burner
Shell Company of Australia Ltd.	1 burner

BERTRAM & BELL AGENCIES:

International Combustion (A/asia) Ltd.

"Kidwell" Watertube Boilers.
"Combustion" Steam Generators.
"Lopulco" Pulverised Fuel Systems.
"Louvre" Mechanical Stokers.
Class "A" Travelling Grate Stokers.
Type "E" Single Retort Underfeed Stokers.
"Frederick" Multiple Retort Underfeed Stokers.
Class "B" Underfeed Stokers for Small Boilers.
"Unit" Stoker for Domestic Boilers.
"Usco" Coal Handling Plant.
"Usco" Ash Handling Plant.
"Ivor" Soot Blowers.
Industrial Grinding, Filtering and Screening Equipment.

Other Agencies:

"Perfecta" Boiler Tubes.
"Yarway" Boiler Mountings.
"McDonnell & Miller" Water Feeders.
"Viking" Rotary Pumps.
"Swartwout" Feed Water Regulators.
"Holden & Brooke" Steam Traps.
Automatic Control Systems.
Industrial Instruments.

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"ECONOMATIC"

ESPLIN & FIRMAN

OIL FIRING ENGINEERS

28 BOND STREET, SYDNEY, N.S.W.

Telephone: B W 1087

"ECONOMATIC" OIL FIRING SYSTEMS (Automatic or Manual Control) for Hot Water Services, Central Heating, Air Conditioning, Kitchen Stoves and Grillers, Industrial Boilers, Galvanising Baths, Bakers' Ovens, Pastrycooks' Ovens, Furnaces, etc.

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S.A.A. File No.

NO COAL BUNKERS
NO ASH BINS
NO WOOD HEAP

NO DIRT
NO KINDLING
NO LABOUR

NO DELAYS
NO SMOKE
NO ODOUR

NO BANKING FIRES
NO HEAVY BILLS
NO INCONVENIENCE

The "ECONOMATIC" Burner

This burner, invented in Australia, was especially designed to handle satisfactorily the heavy fuel oils prevalent in this country, and, by reason of its low consumption and ease of ignition and control, is particularly suitable for small domestic boilers, as well as for kitchen ranges, grillers, etc. It is sturdy, neat, extremely simple, and manufactured with great care and precision. It contains no moving parts, and can be installed with ease One small hand-wheel regulates the intensity of the flame.

Because of the very complete atomisation (and consequent perfection combustion), the burner ignites very easily and burns with a quiet, soft flame that does not tend to go out It gives very high efficiency under fully-automatic, semi automatic or manual control, and is manufactured in several models whose varied capacities provide for different ranges of fuel consumption.

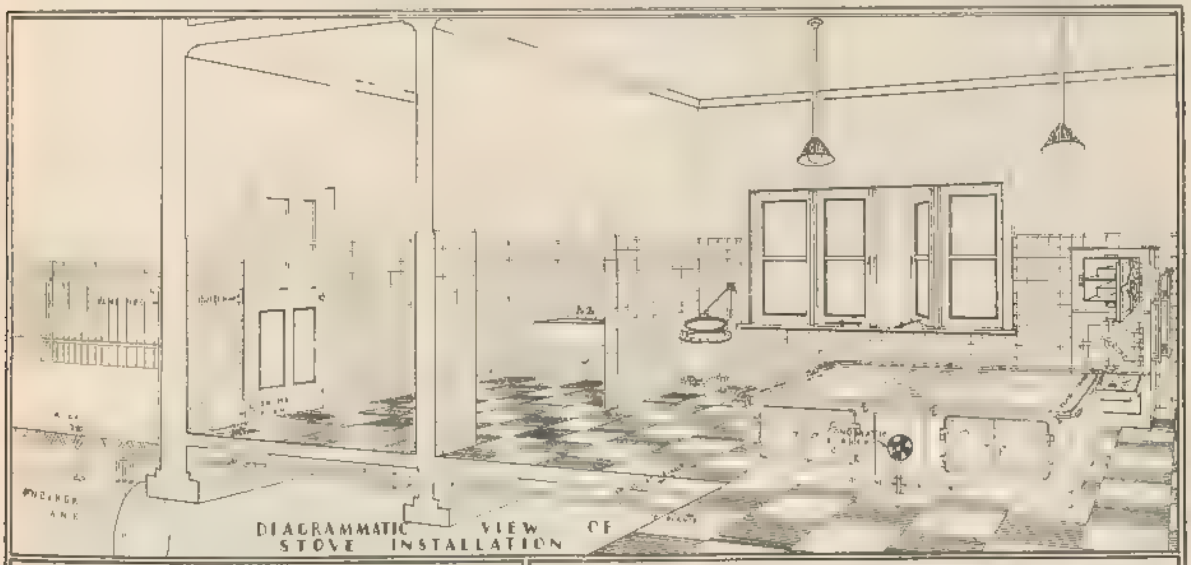
Illustrated below is a typical "ECONOMATIC" installation to an island kitchen range.

The "ECONOMATIC" Plant

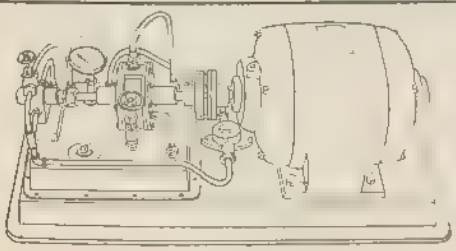
The plant, which is particularly quiet, is compact, simple, of most robust construction throughout. The oil pump and rotary air compressor (ball-bearing) are direct driven by small electric motor, and all are firmly mounted on cast-iron bed plate. Fuel oil strainer, automatic damper regulator (if required), automatic lubricator, air pressure gauge and cock are also incorporated

The plant can be installed in any convenient space at any distance from the burner, to which it is connected only by small pipe lines which can be run beneath the floor or in any other position. Also, one plant will operate two or more burners if both are controlled manually or by the one set of thermostats.

Automatic controlling instruments (complete with ignition and safety devices) are fitted when required. These will maintain constant steam pressure or water temperature in boiler, or constant room temperature, the burner automatically igniting and cutting out without attention.



DIAGRAMMATIC VIEW OF STOVE INSTALLATION



THE "ECONOMATIC" PLANT

"ECONOMATIC"
OIL FIRING SYSTEMS
MADE IN AUSTRALIA

ESPLIN & FIRMAN
ENGINEERS
28 BOND STREET SYDNEY N.S.W
TELEPHONE BW 1087

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S.A.A. File No.

MAJOR FURNACE & COMBUSTION ENGINEERING CO.

114-116 TOORAK ROAD, SOUTH YARRA, S.E.1, VICTORIA
Telephone W ndsor 1111

Interstate Engineer-Representatives

S.A.—Pascoe & Co., King William St., Adelaide.
N.S.W.—Sears Heating & Ventilating Co., Sydney
Q'LAND.—Evans Deakin & Co., Brisbane.
W.A. Saunders & Stuart Pty. Ltd., Perth
TAS.—G. R. W. Garner, 123A Charles Street, Launceston.
TAS.—R. L. Ditcham, Collins St., Hobart.

MAJOR

Products and Services

Patented Low-Pressure Air Fuel Oil Burners—rotary atomizing types, capacities ranging between ½ and 60 gallons per hour, and non-rotary types $\frac{1}{16}$ to 8 gallons per hour. Fully automatic Fuel Oil Burners, self-generating steam atomizing Fuel Oil Burners for portable plant, Oil Burning Torches, Direct-coupled Motor Blowers, also Belt-drive Blowers and Pumping Sets for Oil Burners, and a comprehensive range of Oil-burning Accessories.

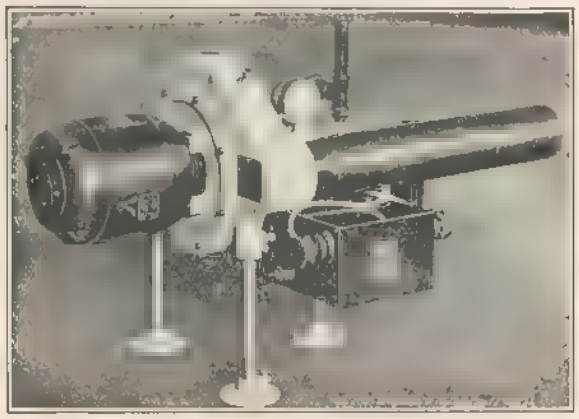
Industrial Furnaces of all types for all fuels. Producer Gas Plants, Automatic and Thermostatic Furnace Controls, etc.; complete Oil Burning Systems designed, manufactured and installed for firing steam and hot-water boilers, kilns, dehydrators, roasters, dryers, ovens of all types, cooking ranges, etc., etc. Experimental work conducted for clients on any new industrial heating problem and plant designed and constructed accordingly under definite guarantee.

Manufacturing Facilities

The Major Furnace and Combustion Engineering Co. has a complete up-to-date plant for the manufacture under the one establishment of all its specialties. Trained and highly-skilled workmanship is employed throughout, and first-class materials only are used.

MAJOR AUTOMATIC BURNERS

The "Major" patent fully automatic burner is available in three standard sizes, viz.—Model 0, Model 1 and Model 2, the normal capacities respectively when used on boiler installations being 2, 4 and 8 gallons per hour. Burners of greater capacity can be supplied if required.



The "Major" Automatic Oil Fuel Burner.

General Description

This efficient burner is of pleasing appearance, robust construction and of careful design with particular regard to accessibility. The burner is of the pressure atomizing type, and for this system a small rotary vane type compressor is embodied in the unit delivering a very small proportion of the air supply at a pressure of from 2 to 4 lbs. per sq. inch. The main air supply for combustion is delivered by a centrifugal fan, which is an integral part of the burner. The patented rotary oil pump is of the positive metering type and delivers the oil directly into the air compressor—the fuel thus acts as a lubricant for the compressor. The oil and the atomizing air are delivered together through the atomizing nozzle which are within the burner draft tube. The ignition is effected electrically with A.C. units by means of high tension current supplied during the starting period from a step-up transformer of exceptionally robust characteristics. The electrodes and the atomizer are in one assembly and can be removed for adjustment in less than one minute. The single phase motor is of the well-known repulsion induction type, which is ideal for automatic operation and, being mounted externally, is most readily accessible. For D.C. Models ignition is by gas. (Electric ignition can be provided if required). Controls are provided for adjusting the main air, the atomizing air and the oil feed. An oil filter is incorporated in the burner unit. The burner ignition and stack safety controls are electrically operated and are combined in one compact unit for installation in the base of the boiler stack. The controls are arranged to give complete protection against electrical or flame failure or mechanical failure in the apparatus itself. A separate control is also provided for regulating the temperature of the boiler.

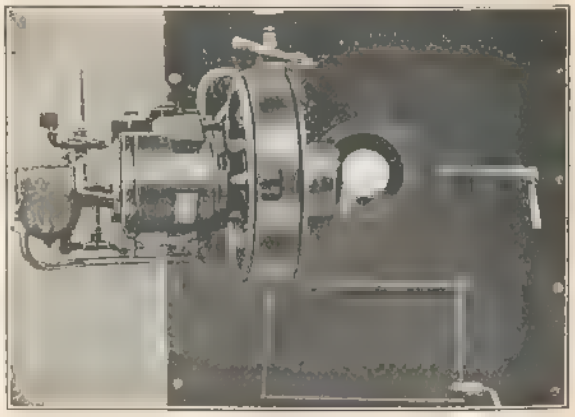
"MAJOR" "MOTOROTARY" LOW PRESSURE BURNER

(SELF CONTAINED TYPE)

The "Major" patent "Motorotary" combined unit type motor driven rotary atomizing oil fuel burner is available in three regular sizes, viz.: Models Nos. 1, 2 and 3, the normal capacities of each, unless supplemented by provision for admitting secondary air, being 1¼, 4 and 8 gallons per hour respectively. With secondary air induced by good draft these capacities may be increased to as high as 4, 14 and 30 gallons per hour. Burners of greater capacity can be supplied if required.

The "Motorotary" burner is a complete unit ready for mounting, with oil connections provided at the hinge bracket. These burners, with the exception of Model No. 1, can be supplied with a "Major" rotary vane type oil pump for direct feed from underground storage, an adjustable by-pass relief valve and connection being provided for the return of surplus oil to the tank—otherwise oil feed is by gravity. Single filters ordinarily are fitted. The "Motorotary" type of burner embodies the same principle of precise nozzle control as the "Major" standard air driven rotary and the non rotary series, ensuring a stable flame and perfect combustion at any setting within the capacity of the burner.

The "Motorotary" Burner, being of unit construction, is simple to instal. Ordinarily these burners are for manual control, but close regulation from automatic controls fitted to the boiler can be arranged if necessary.



A "Major" Model 3 "Motorotary" Burner with oil pump and twin filter shown mounted on a face plate with secondary air control.

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MAJOR PATENTED LOW PRESSURE OIL BURNERS

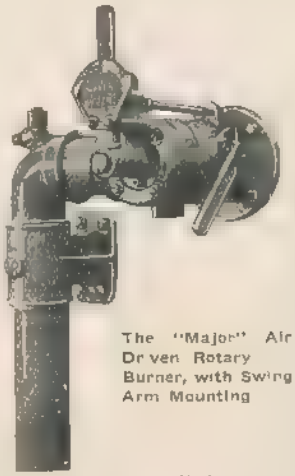
(FOR PIPED AIR SUPPLY)

Rotary Type.

In the development of the "Major" Patent Low Air Pressure Rotary Atomizing Type Fuel Oil Burner, which has involved research work extending over a number of years, the desirability of a constant air-fuel ratio and flame characteristic and the absolute necessity for the ability to produce and maintain a misty atomization of the oil fuel, has been fulfilled, not only for high outputs, but over the whole working range of the burner to a minimum almost on the point of cut off. This achievement, together with the easy and precise control which is incorporated in the "Major" Rotary Burner, means perfect combustion at any working temperature and a stability that allows any desired furnace atmosphere to be held without variation indefinitely.

The Burner is carried on a special swing arm mounting, whilst no portion of the burner enters the firing chamber. Mechanical wear in long continuous service is negligible. As with other "Major" products, the "Major" Patent Rotary Burner is a high class engineering accomplishment, scientifically evolved, and proved for dependable and efficient service. Sizes range to 60 gallons per hour capacity.

Refer to tables for capacities of various sizes.



The "Major" Air Driven Rotary Burner, with Swing Arm Mounting

Non-Rotary Type.

The "Major" Patent Non-Rotary Burner has been developed to fulfil the requirement for a lower-priced production as compared with the "Rotary," and whilst the performance of the Non Rotary does not approach the high degree of perfection that characterizes the "Rotary," it nevertheless is a remarkably efficient Burner, and may be used wherever the extremely fine and flexible control of the "Rotary" type is not essential and where the fuel capacity of the burner does not require to exceed four gallons per hour without secondary air, or eight gallons per hour with air induced by stack draft. For example, this type of Burner finds its application with certain classes of heat treatment and metal melting furnaces, porcelain furnaces, pottery kilns, etc., also boilers up to 20 h.p., or 200 square feet heating surface. In applying the "Major" Non-Rotary Burner, a fixed bracket mounting only is necessary, but, if desired, a swing arm mounting can be supplied for the larger sizes. Although the "Major" Non-Rotary Burner has been evolved to enter into price competition with other low-priced oil burners, the exclusive air control is such that the flame velocity always remains constant, whilst the micrometer oil valve assures such close regulation as cannot be obtained with commercial needle valves. Sizes range to eight gallons per hour capacity.

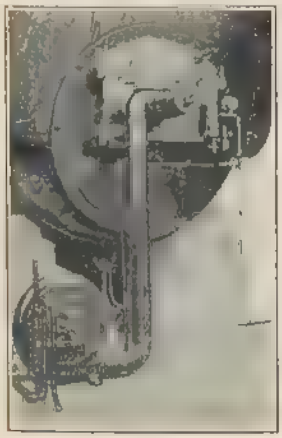
Blowers.—Direct Coupled Motor Driven or Belt Drive Blowers available for operating any number of Burners.

Capacity Tables

APPROXIMATE CAPACITIES OF "MAJOR" LOW PRESSURE OIL BURNERS
(AIR PRESSURE 7in. to 10in. WATER COLUMN)

Burner Size and Type.	MAXIMUM CAPACITY PER HOUR. Without secondary air supply (Furn. work with slight back pressure)	With secondary air moderate draught (Boiler work) 1/10in water column in firebox	With secondary air good draught (Boiler work) 4in. water column in firebox	Minimum gallons per hour
2¾in. Rotary (1¾in Noz.)	3½ gals.	7 gals.	14 gals.	¾ gal
3¾in. Rotary (2⅛in Noz.)	7 gals.	14 gals.	28 gals.	1½ gals.
5in Rotary (3⅞in Noz.)	14 gals.	28 gals.	56 gals	3 gals.
"Midget" Non - Rotary (⅝in. Noz.)	3½ pints	1 gal	1 gal.	½ pint
"Midget" Non - Rotary (⅞in. Noz.)	7 pints	2 gals.	2 gals.	½ pint
2in. Non Rotary (1⅜in. Noz.)	1¾ gals.	4 gals.	4 gals.	¾ gal.
2¾in. Non-Rotary (1¾in. Noz.)	3½ gals.	8 gals.	8 gals.	¾ gal.

The "Major" Non-Rotary Burner, with Fixed Bracket Mounting.



A Typical Boiler Firing Installation with "Major" Low Pressure Air Oil Firing Equipment.

REPRESENTATIVE INSTALLATIONS—(PARTIAL LIST)

ENGINEERING USERS

The Victorian Railways (Newport Workshops)
The South Australian Railways (Islington Workshops)
The Commonwealth Railways (Port Augusta Workshops).
The Tasmanian Government Railways Workshops, Launceston
Broken Hill Associated Smelters
Thomsons Engineering & Pipe Co. Ltd
[illegible] Engineering Co. Adelaide.
Sunnerset Ltd. [illegible]
Richardson Cars Ltd., Footscray.
[illegible] Spring Pty. Ltd. South Melbourne

BOILER FIRING

William Lawrence (Globe Dye Works) Pty Ltd. Prahran.
Luton Dye Works, St. Kilda.
Federal Steam Laundry Brunswick
Eye & Ear Hospital, Melbourne.
Gilbey, W. & A., Ltd (Distilleries), West Melbourne
Hecla Electrics Pty. Ltd., North Prahran
M[illegible] & Co. Hindmarsh, S.A.
Beaurepaire Tyre Service Melbourne Ballarat [illegible] Geelong
Davies, Coop & Co. Pty Ltd., Melbourne

MISCELLANEOUS

Wunderlich Ltd., Brunswick and Sunshine, Victoria—Tile Kiln and several Faience Kilns
Collingwood City Council, Bitumen Plant and Stone Dryer.
Victorian Country Roads Board — Travelling Bitumen Heaters
Sargents Ltd., Sydney Scotch & Vienna Ovens, Reel Ovens.
Colonial Sugar Refining Co. Sugar Char Kilns.
Troedel & Cooper Pty Ltd., Printers—Varnished Paper Drying
Commonwealth Works (Aviation Depot) Cooking Ranges.
Haigh's Chocolates, Adelaide Confectionery Stoves.
Rosella Preserving Co., Richmond—Soldering Machine Furnaces, etc
Barrett Bros. & Burston, Melbourne — Malt Roasting

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S.A.A. File No.

E. ESDAILE & SONS

Surveying and Scientific Instrument Makers

Telephone: B 2210 — Esdaile House, 42 Hunter St SYDNEY — Cables: "ESDAILSON, SYDNEY"

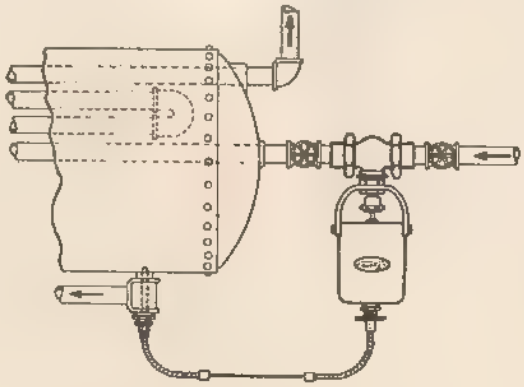
See also Page 4 for other Instruments.

IMPORTANCE OF ACCURATE TEMPERATURE CONTROL

By conserving heat and labour, accurate control of heat reduces expense in operating any apparatus Control refers to automatic regulation of temperature to allow exactly sufficient heating or cooling medium to enter the apparatus to produce the required conditions. It is difficult to control temperatures by hand-operated valves owing to varying boiler pressures in the supply lines and the time taken to note changes and make adjustments, but in automatically controlled valves, the correction of any change is instantaneous. Controls can be either self-acting, air-operated or electric contact.

Purpose of the "Tycos" Self-acting Temperature Regulators

Self-acting Temperature Regulators, direct-acting, are designed for use in Exhaust Boxes, Open Tanks, Sterilisers, Hot Water Storage Tanks, etc., and for all installations where the compressed air is not available, where the additional expense of an air compressor would not be warranted, and where control within close limits is not wanted.



Bulbs and Control Ranges

Copper bulb 19 ins. long by $1\frac{3}{16}$ ins. in diameter, with $1\frac{1}{4}$ ins. threaded union connection, for range 100 degs. to 160 degs. F.; bulb 18 ins. long by $\frac{5}{8}$ in. in diameter, with $\frac{3}{4}$ in. or 1 in. threaded union connection for range 140 degs. to 212 degs. F. Can be furnished also with range 190 degs. to 270 degs. F for retort applications.

Particulars of air-operated and electric contact controlling systems can be had on application Kindly give details of process.

Operation

A thermostatic bulb is placed in the apparatus to be controlled. As heat is applied to the bulb the volatile liquid inside sets up a vapour pressure proportional to the temperature. This pressure is transmitted through the connecting tubing to a "Stack" of metal diaphragms attached to the upper end of the valve stem, thus moving the valve disc toward the valve seat By means of the adjustment at the top of the diaphragm housing the valve can be closed at any desired temperature within the range of the instrument. Reverse acting regulators are also obtainable for refrigeration purposes

Installation

Regulators should be installed with the valve in a horizontal line rather than a vertical line, and with regulator mechanism above and not below the valve body.

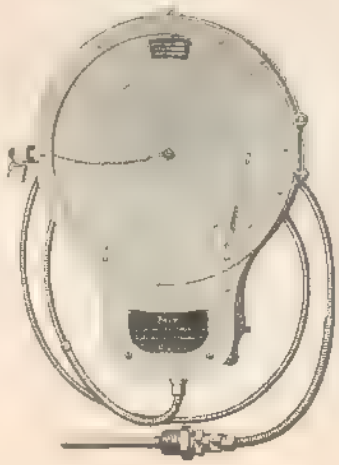
How to Specify

When ordering regulators, always specify the following information:

1. Size of steam line.
2. Maximum and operating steam pressures.
3. Operating temperature required.
4. Name of manufacturer and type of machine on which regulator will be used

"TYCOS" RECORDING THERMOMETERS

By the use of recording thermometers a true record of all temperature conditions is furnished and serves as a guide to the efficient working of any particular apparatus. Recording thermometers are made with ranges varying in suitable stages from —100 deg. Fahr. to +1,000 deg. Fahr. They are manufactured with flexible capillary connecting tubing, enabling temperature indications to be read at a distance of up to 100 ft. from the source of the heat. They are provided with charts of several hours, daily, or weekly duration Besides single records, instruments are provided for the registration on the one chart of two independent temperatures such as "wet" and "dry," or in two separate sets of apparatus.



Recording thermometers are supplied with the connecting tubing made of steel nickel-plated or lead plated, also in copper with bronze armour. Bulbs and connection pieces to suit the apparatus to which it is to be applied can be furnished.

How to Specify

When ordering, give the following information re specific requirements:

1. Length of flexible connecting tube.
2. Way in which bulb is to be connected
3. Range of temperature required
4. Whether case is preferred in white or black pressed-metal.
5. Application, with the process and name of apparatus on which the instrument is to be used.
6. Medium, the temperature of which is to be measured

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30g

AUTOMATIC HEATING APPLIANCES PTY. LTD.

TEMPLE COURT, MELBOURNE, C.1

(See page 404 for Interstate Representatives)

30g

POWERS REGULATORS

Automatic Temperature Control of Atmosphere

Uniform temperature conditions, besides being essential to good health, make for the full effectiveness of the worker in school, office or factory.

Automatic temperature or thermostatic control supplants the unreliable, wasteful, and always unsatisfactory hand regulation of controls on a heating system. Steam or hot water valves, for instance, open wide automatically as the temperature falls slightly, and close proportionally if the room temperature rises.

Type "D" Thermostat.

Temperature Control for Industrial Purposes

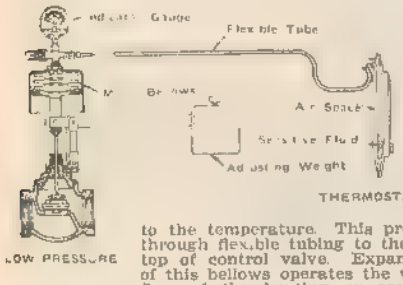
Wherever heat is used in industrial processes, improved results follow its automatic control. Not only is fuel economy secured, but the product itself is in nearly every case improved if processed under the right temperature.

There are more than fifty different types of regulators made to control temperature of liquids, gases, and air in industrial purposes. Self operated or compressed air operated types are used.

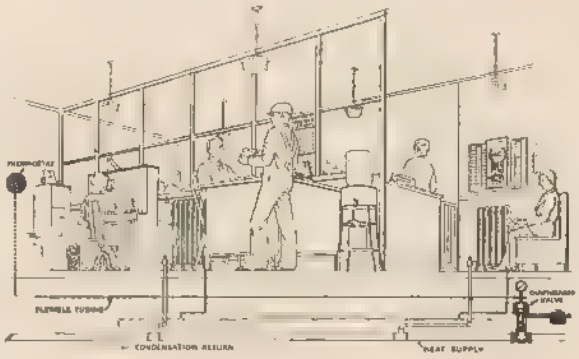
Types

There are two general divisions into which devices for thermostatic control may be grouped: Self-operating and Compressed Aid Operated.

Self-operated regulators are self-contained and operate without the aid of any outside power, such as electricity, compressed air, or water power. (See diagram opposite.) A thermostat (for atmosphere control) or a thermostatic bulb (for liquid control) contains a sensitive fluid, hermetically sealed. This fluid vapourises when bulb is exposed to heat, developing a saturated vapour pressure corresponding to the temperature. This pressure is transmitted through flexible tubing to the all-metal bellows in top of control valve. Expansion and contraction of this bellows operates the valve which regulates flow of the heating or cooling medium to the receptacle under control.



Compressed Air operated regulators require a constant supply of compressed air at 15 lbs. pressure for their operation. Pipes deliver this pressure to thermostats in rooms, or to thermostatic bulbs in liquids to be controlled.



Powers No. 18 Regulator Applied to Direct Heating System.

POWERS No. 18.

Powers No. 18 is a self operating temperature regulator for the control of atmospheric temperature in offices, shops, factories, storage rooms, drying rooms, warehouses and greenhouses.

Used for general control between the limits of 60 degrees and 100 degrees F., when such control can be obtained by the operation of a single valve regulating the supply.

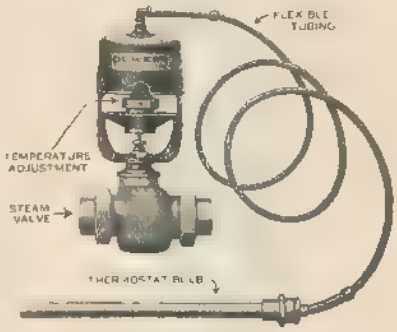
POWERS No. 10.

Powers No. 10 is a compressed air operated regulator. Several valves controlling the heat to various compartments may be regulated by the system. This type of regulation gives the most accurate control. It may also be used to control liquid temperature from 0 degrees up to 800 degrees.

POWERS No. 11.

Powers No. 11 is a self - operating regulator for the control of liquid temperature applicable to hot-water tanks, calorifiers, vats, steam kettles, pre-heaters washers, etc.

Used for systems or processes involving temperatures between 40 and 250 degrees F., but in no case may the individual regulator have an adjustment range of more than 20 degrees above or below the specified operating point.

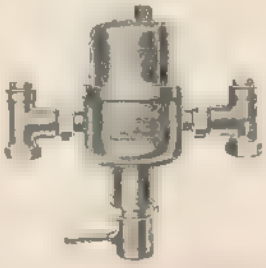


For greater temperature ranges use a compressed air operated regulator

Powers Thermostatic Water Controller

(Capacity 15 to 100 gallons per minute)

This type of controller mixes hot and cold water and delivers mixture at a constant temperature. It can be adjusted to maintain various delivery temperatures and the adjustment is limited so that the water above a predetermined temperature cannot pass. Failure of cold water supply substantially shuts off delivery.



This controller may be used to supply warm water for the washing of woollens and delicate coloured goods laundries, paint rubbing in auto body plants, degreasing fabrics, washing photographic plates and films, gang showers, continuous flowing baths, etc.

Powers Knee-Action Mixer

(For Surgeons' Wash-up Sinks)

With this mixing valve a surgeon can wash his hands without danger of scalding, and without the annoyance of unexpected changes in the temperature of the wash water. It is made entirely of bronze and brass, finished in nickel - plate. Mixer is simple in design, rugged, durable, and requires no foot pedals or floor attachments. Capacity is six gallons per minute under 40 pounds pressure.

(Continued on next page)

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McALEAR WATER FEEDERS

Direct-to-Boiler Water Feeder and Controller

Automatic control of water supply to boilers is most important to their safe and economical operation. Too much water means inefficiency and increased fuel costs. Lack of water means grave danger of fractures, burn outs, shut downs and expensive repairs. Therefore, on all modern installations, McAlear Water Feeders and Controllers are absolute necessities.

Types

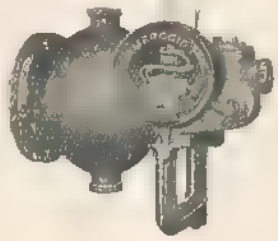
Manually fired boilers should be equipped with Simplex or Duplex feeders.

Oil or automatically coal fired boilers should be equipped with Combination Water Feeder and Controller with low water cut-out or low water and pressure switch.

No. 866 WATER FEEDER AND CONTROLLER

(With pressure and low water cut-out switches for use on oil burners and automatic coal stokers.

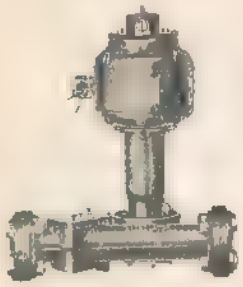
Supplies the make-up water necessary to maintain constant boiler water levels and at the same time protects the boiler by sounding an alarm and/or shutting off the fuel supply, should the water supply pressure fail, or for any other reason the boiler water level reach the danger point.



In addition it is provided with a combination pressure and low water cut-out switch, which enable it to start and stop the oil burner or the automatic coal stoker between two definite pressures, and in case of low water, shut off the automatic fuel supply before any damage is done to the boiler.

THE HYDROLATER

(For stimulating hot water circulation)



The Hydrolator is a motor-driven centrifugal pump designed to stimulate the circulation on balanced two-pipe hot water systems, open or closed type. It consists of a quiet, powerful Repulsion-induction Motor mounted on a 12-in. pipe section with the pump rotor located in the pipe section. Rotor is off the line of water flow so as not to interfere with natural circulation when the Hydrolator is shut off.

Sizes

Type	Pipe Size.	Motor H.P.	Capacity (Gals. per min.)	Weight.	Head.
(For Heating Systems)					
H1½	1½ in.	½	13	50	1½ ft.
H2	2 in.	1/6	20	60	1½ ft.
H3	3 in.	¼	32	80	1½ ft.
(For Domestic Hot Water Supply)					
H1½	1½ in.	1/6	13	53	1½ ft.
H2	2 in.	¼	20	65	1½ ft.

The Hydrolater Principle

The faster hot water flows through a system the more heat it conducts to the radiators. That is the basic principle of the Hydrolator and that is just what this device does, namely to circulate water several times faster than it flows by ordinary thermal action.

Installation

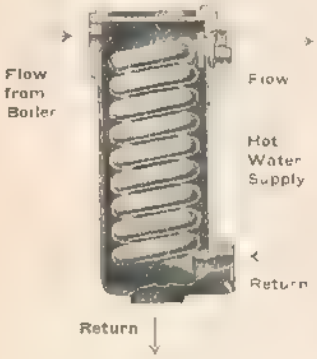
Simply cut out a 12-in. length of the return line (if an existing system) near the boiler and thread the pipe for flanges. Flange unions are supplied with the Hydrolator.

Phantom View Indicating Flow

Control

May be controlled manually or by an ordinary switch or automatically. When used with an oil burner it may be connected in multiple with the oil burner motor to start and stop with the burner.

EXCELSO WATER HEATER

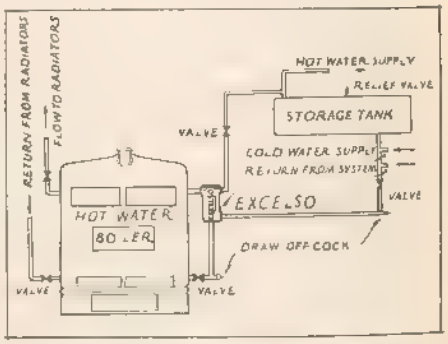


Hot Water at Lowest Possible Cost

Excelso Water Heaters furnish a constant and uniform supply of domestic hot water for lowest known cost in homes, apartments hotels, and offices. They use the fire in the boiler or furnace to save the care and cost of a separate water heater, connect with regular piping and storage tank. Self operating. Any plumber or steamfitter can install easily and quickly.

Copper Coil Heating Elements

[illegible] Water [illegible] copper coil heating element fitting into the cast-iron shell by means of patented ground joint brass [illegible]



Types and Sizes

(a) Single Copper Coil Indirect Heater for homes and small buildings.

Size		11	12	13	14	15
Length	in.	8½	10½	14	11½	15	19½
Diameter	in.	5	5	5	6½	6½	6½
Shell Openings	in.	1	1	1	1½	1½	1½
Coil Openings	in.	¾	¾	¾	1	1	1
Weight, crated	lb.	11	17	23	31	39	46
Cap. below water line,	gal	30	35	45	60	90	120
Cap. with live steam at 5 lb. pressure	gal.	4	5	[illegible]	[illegible]	13	20

(b) Double Copper Coil Heater for [illegible] such as apartment houses, medium [illegible] etc.

Size.		25	26	27	28
Length	in.	12½	15	19	23½
Diameter	in.	9	9	9	9
Shell Openings	in.	2	2	2	2
Coil Openings	in.	1½	1½	1½	1½
Weight, crated	lb.	58	68	82	95
Cap. below water line	gal.	150	200	300	400
Cap. with live steam at 5 lb. pressure	gal.	250	300	450	600

(c) Triple Copper Coil Heater is designed for still larger installations as laundry, hotels, etc. Also used in heating radiation.

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SECTION R

[Containing S A.A. Filing Section No. 31]

ELECTRICAL WORK

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29d

S A A File No

STATE ELECTRICITY COMMISSION OF VICTORIA

Head Office:
22 WILLIAM STREET, MELBOURNE.
Tel C.8292 and C.9447

Power Stations:
YALLOURN · NEWPORT — RICHMOND AND GEELONG
SUGARLOAF - RUBICON (Hydro Stations)

District Undertakings:	Tel.
CASTLEMAINE DIST.: Castlemaine	238
EASTERN METRO. DIST.: Dandenong	182
GEELONG ELEC. SUPPLY: Geelong	1941
GIPPSLAND DIST.: Traralgon	114
METRO. ELECTRIC SUPPLY: Cent.	10310
NORTH-EASTERN DIST.: Benalla	276
WESTERN DIST.: Colac	246

S E C

[For Other Products, See Index]

History

In 1916 several factors operated in Victoria to direct the attention of Parliament to the advisability of establishing a comprehensive scheme of electricity supply, based on the State's own resources, viz: that a shortage of electrical energy in the metropolis, involving a serious check to industrial development, was imminent; that, while the existing power houses in the metropolis had reached a stage beyond which expansion was economically impracticable, few, if any, small rural centres had any supply at all; that Victoria was dependent for electrical generation upon imported black coal, and its industries were being frequently disorganised by troubles at the mines and on the waterfront; and that the price of black coal was rapidly increasing. In 1917, an Advisory Committee, appointed by the Government, reported that the brown coal fields of the State offered a much more certain and economical fuel supply for the production of electrical energy than did black coal. In the following year the State Electricity Commission was constituted. The legislation governing its constitution envisaged a comprehensive system of transmitted supply for the State. After surveying the power potentialities of the State, the Commission recommended, as the basis of this system, the erection of a power house at Yallourn, with an initial capacity of 50,000 kilowatts. Parliament approved. The first sod was turned at Yallourn in February, 1921, and the generating, transmitting and receiving facilities were in complete operation in June, 1924.

Power House at Yallourn.

Sources of Electrical Energy

Victoria has unlimited deposits of brown coal capable of being won by the cheap, open-cut method, in which large-scale mechanical processes govern every phase of operations. In the Yallourn area there are 6,000,000,000 tons of open cut brown coal, averaging 200 feet thick, covered by overburden of an average depth of 50 feet. The coal at present being worked averages 180 feet thick, and the depth of overburden less than 30 feet. The Latrobe Valley, in which Yallourn is situated, is estimated to contain 27,000,000,000 tons of brown coal.

Water power schemes, including the Hume Reservoir, and likely to yield an aggregate of 200,000 horse-power of energy, are within the bounds of practicability when the nature of the demand justifies their serious consideration. Just as the Sugarloaf Reservoir at the junction of the Goulburn and Delatite Rivers, at present provides an economical source of power in conjunction with the Rubicon and Royston Rivers, so it is very probable that at a later date the Hume Reservoir will, on a larger scale, afford a valuable scheme, in conjunction with the Mitta River.

Functions of the Commission

The functions of the State Electricity Commission may be divided into three broad sections, viz.:—

1. The co-ordination and control of the generation, supply and use of electrical energy throughout the State, embracing the administration of the Electric Light and Power Act.
2. (a) The investigation of possible sources of power;
   (b) The exploitation and development of any such sources of power selected.
3. The encouragement and promotion of the use of electrical energy in every phase of life, rural, domestic, and industrial.

Transmission and Distribution

Three main transmission lines feed from power houses into the receiving stations of the completely inter-linked system. These are the two 132,000-volt lines from Yallourn (one to the Yarraville and the other to the Richmond terminal station), and the 66,000-volt line which brings the hydro-energy from Sugarloaf-Rubicon to Thomastown terminal station. Two peak load stations in the metropolis (Newport "B" and Richmond) feed at 22,000 volts into Richmond and Yarraville. The aggregate capacity of the generating plant (including installations in progress) is roughly 200,000 horse-power. The main points in the metropolitan distribution network are the various major sub-stations, which receive the energy from Yarraville and Richmond at 22,000 volts, for stepping-down and despatch to minor sub-stations, where the pressure is reduced to the supply voltage. The first section of the 66,000-volt ring main which will eventually link Ballarat, Bendigo and Geelong with the system, and consummate it as a complete power scheme for the State, now serves Castlemaine and centres en route. From the 1,500 miles of high-tension transmission lines and the 525 sub-stations which form the basis of the distribution system, supply is given to 178 centres throughout the State, 108 of which had no supply previously. They include many small towns and farming communities.

The Future

The sufficiency of electric supply in Victoria is guaranteed by the provisions that have been made for meeting all possible demands upon the system until at least the winter of 1934, long before which date the Commission will have perfected its plans for supplying any further increments of loading. The whole scheme is on such a sound technical and financial basis, and the use of electrical energy for all purposes is becoming so universal, that only the most adverse external factors could militate against its progress.

(Continued on next page)

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Work of Standardisation

In the work of co-ordinating and standardising supply, the Commission has acquired and closed down a number of small individual generating stations in various parts of the State, preparatory to making transmitted energy at standard voltage available from its large inter-linked power stations. With regard to all new individual plants authorised in centres at present beyond the economic reach of transmitted energy, uniform standards of construction, system and voltage are provided, so that such centres may be easily connected with transmitted supply at any time, and wherever the Commission has initiated supply, the standard system obtains. It has organised the whole system of eletricity supply in Victoria, so that the growing demand for energy shall be anticipated and provided for in the most economical manner, either by the extension of its existing plants or by the exploitation of new sources of supply

Briquettes

Plus the electrical power which brown coal affords, Yallourn briquettes are an important factor in helping to make the State independent of imported fuel supplies. Characteristics of briquettes are their high calorific value, smokelessness, cleanliness, small ash residue, and standardised quality. Continuity of supply and standardised prices are additional advantages, and they are now recognised as the ideal fuel for industrial and household purposes. The factory produces 1200 tons a day

ELECTRICITY AS A CONTRIBUTION TO THE ART OF BUILDING

The building of to-day must provide something more than four walls and a roof or merely protection against the elements. Through the medium of electricity it has been possible to embody labour-saving devices and conveniences which make possible many of the most important daily operations of home or business life It moves workers from the street to the office in a swift and comfortable manner, provides the correct kind of light for any work in any part of the structure, cools or warms it as may be required, and delivers clean fresh air to the smallest room no matter how far it may be removed from the outside walls. It has revolutionised the home and is the housewife's greatest and most efficient servant.

ELECTRICITY IN THE HOME

The comfort of a home is generally measured by its convenience, and convenience in these days is in a large part a matter of electrical service. The effectiveness of this service depends on the completeness of the wiring system in the home. Adequate wiring may be installed in new houses at only a small increase in cost over an incomplete or inadequately wired job.

A brief specification of the minimum wiring requirements for the modern home is given in the following schedule

Room	Lighting	Power
Hall	One ceiling outlet (two-way switching)	One outlet
Dining Room	One outlet (centre ceiling)	One outlet for each 150 square feet of floor area
Lounge or Living Room	One ceiling outlet if room is nearly square If length is more than 1½ times the width, two ceiling outlets.	One outlet for each 150 square feet
Breakfast Room	One outlet (centre ceiling)	One outlet
Main Bedroom	One ceiling outlet and one bracket outlet on wall	One outlet
Other Bedrooms	One outlet (ceiling)	One outlet
Bathroom	One ceiling outlet and one bracket outlet on wall	One outlet (connection either for storage hot water system or outlet for bath heater)
Kitchen	One outlet (ceiling)	(a) Outlet for water heater (b) Outlet for 6 kW range (c) One outlet for appliances (d) One outlet for refrigerator
Laundry	One outlet (ceiling)	One outlet
Front Porch	One outlet	
Back Porch	One outlet	
Garage	One outlet	One outlet

Notes

1. All power outlets not specified shall be rated at not less than 2000 watts. Plugs for attachment to all power outlets of equal rating shall be interchangeable.

2. In the case of lounge, living, dining, breakfast rooms and kitchen where only one power outlet is to be installed, this outlet should be of the duplex type.

3. When two or more power outlets are to be installed in a room, they should be approximately equally spaced around the perimeter

4. Provision should be made in the room in which the radio set is to be installed for an approved permanent outlet for supply to the set.

5. The switchboard should be of sufficient size to allow at some future date the installation of—

(a) For six-roomed houses and under, one additional lighting circuit and one additional power circuit.

(b) For seven-roomed houses and over, one additional lighting and two additional power circuits.

6. The plumbing specification should provide a hose bib for filling a washing machine, and also a drain for emptying it.

7. Lights should be provided in passages, landings, storerooms pantries and outhouses where the convenience will amply repay the small additional cost.

8. Ample provision should be made for two-way switching of lights in rooms or passages with more than one exit or entrance

9. Provision should also be made for installation of a bell transformer for operating the electric bell.

10. Ornamental bracket lighting points in dining and lounge rooms add appreciably to the attractiveness of a lighting installation

11. The installation shall comply in every respect with the Wiring Regulations applicable

Service Mains and Meters

Before any provision is made by an architect or builder for the location of service mains and meters, it is recommended that the local electricity supply undertaking should be approached concerning its conditions for the provision and attachment of service mains, and the location of meters

(Continued on next page)

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LIGHTING

Artificial illumination at its very best is only a small fraction of the daylight intensities to which we are accustomed. An installation which may be referred to as "too bright" or using "too much light" in most cases is really insufficiently diffused light. A bare lamp is not only glaring, etc., but it wastes nearly half of its light in useless directions. Reflectors are used, therefore, to direct the light into useful directions, and also overcome the effect of glare. This glare is objectionable, as it may injure the eyes, and also cause discomfort and fatigue.

A simple method of calculating the required illumination or required wattage by the "lumen" method is given below.

L lumens required per outlet (for size of lamp refer to table No. 1)
A area to be lighted.
F foot-candles required
N number of outlets
K co-efficiency of utilisation (see table No. 2)

Then $L = \frac{A \times F}{N \times K}$

TABLE 1

Approximate Values of Lumens Output—Gas filled Lamps—200-250 volts.

Watts	60	75	100	150	200	300	500	1000
Total lumens	570	790	1160	1920	2800	4450	8300	18,500

TABLE 2

UTILISATION CONSTANTS

Allowing 25 per cent service deprecation to compensate for normal dust and dirt accumulation on lamps and reflector equipment.

Ceiling		Light			Medium			Dark	
Walls		Light	Med.	Dark	Light	Med.	Dark	Med.	Dark
Reflector	Lamp								
RLM Standard Dome	Clear	[illegible]	47	.45	48	46	[illegible]	[illegible]	44
RLM Standard Dome	Bowl Enam.	42	41	39	41	40	38	[illegible]	[illegible]
Deep Bowl, concentrating steel reflector	Clear	.41	39	.37	.39	.38	[illegible]	[illegible]	[illegible]
Reflector Cap Diffuser	Clear	.35	34	32	34	33	[illegible]	[illegible]	
Deep Bowl, Glass	Bowl Enam.	40	38	36	37	.35	33	[illegible]	
Diffusing Enclosing Globe	Clear	37	34	32	35	.33	31	31	30
Light Opal, Semi Indirect	Clear	.34	31	28	29	.26	23	21	19
Dense Opal, Semi Indirect	Clear	.29	27	25	22	20	19	16	14
Totally Indirect	Clear	27	35	.23	20	.18	16	12	.10

This method provides a simple means of checking or estimating an installation, but its use is not recommended in larger semi-indirect or indirect lighting installations where many other factors must be taken into consideration.

TABLE 3

The average foot candles to give satisfactory illumination for various types of service is given as under:

Service	Average Foot Candles
Automobile Showroom	[illegible]
Bank (general)	[illegible]
Billiard Room	[illegible]
Billiard Table	[illegible]
Church	[illegible]
Cinema	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
Factory	
General	[illegible]
General, without local illumination	[illegible]
Local bench	[illegible]
Local bench (fine work)	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
Hospital—	
Corridors	[illegible]
Wards (no local illumination)	[illegible]
Wards (with local illumination)	[illegible]
Operating table	[illegible]
[illegible]	[illegible]
Reading Room (without local illumination)	[illegible]
Reading Room (with local illumination)	[illegible]
Market	[illegible]
Offices (general)	[illegible]
Reading (ordinary print)	[illegible]
Reading (fine print)	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
Kitchen	[illegible]
Bedrooms	[illegible]
Restaurant	[illegible]
School	
Class Room	[illegible]
[illegible]	[illegible]
Sewing	
Light goods	[illegible]
Dark goods	[illegible]
Stores	
Interior	[illegible]
Show Windows	
Light goods	[illegible]
Medium goods	[illegible]
Dark goods	[illegible]
Showrooms	[illegible]
Stadia	[illegible]
Theatre	
Lobby	[illegible]
Auditorium	[illegible]
Warehouse	[illegible]
Yard Lighting	[illegible]

Example—To determine the wattage of a lamp for a lounge room 12 ft. x 14 ft. Walls and ceiling light in shade and using a semi indirect bowl—

$$\text{Lumens} = \frac{168 \times 4}{1 \times .34} = 1[illegible]$$

The nearest sized lamp would be a 150 watt size.

VACUUM CLEANING

Provision should be made in all buildings for some method of vacuum cleaning. Either of the two following systems may be adopted:

1. A fixed piping system using an electrically-driven vacuum pump and separator.
2. Portable electric cleaners operated from power outlets installed throughout the building.

The fixed piping system has the advantage of delivering all the collected material to one container, but its installed cost is greater than that of the providing a system using portable cleaners.

Ten amp. power outlets should be provided for portable electric cleaners.

STRUCTURAL FABRICATION

Arc welding has grown from an emergency means of repairing or building up castings until it now holds an important place in the structural and industrial fields. Electrically-welded joints, if properly made, are stronger in tension, torsion, compression or shear than riveted ones. The necessity of punching or drilling holes reduces the strength of the original section, whereas welding strengthens it. The cost of welding usually is less than that of riveting, and the main reason for its restricted use in the fabrication of steel structures is apparently due to lack of experience and appreciation of its possibilities. As a joint or structure is only as strong as its weakest point, the weakness in riveted joints is usually compensated for by the use of correspondingly heavier metal. As welded joints can be made as strong as adjacent sections, lighter material can be used where welded rather than riveted joints are used.

The maximum advantages inherent in using arc welding can only be gained by designing the work specifically for welding.

The erection of a welded structure can be carried out almost without noise, whereas in a riveted structure the noise of the riveting hammers, specially in city streets, becomes very objectionable.

(Continued on next page)

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POWER

Electricity is almost universally used through the medium of the electric motor to supply the mechanical power required by industry, etc. Its chief advantages as a form of motive power are:

1—Reliability
The electric motor is the most reliable form of prime mover, and the supply of electricity from modern generating stations is practically free from breakdowns.

2—Capital Cost
No other form of prime mover can be installed as cheaply as an electric motor.

3—Extensions
Additional motors as and when required can be quickly and easily installed.

4—Operating Labour
No skilled labour is required to operate an electric motor, and, if necessary, it can be arranged for fool proof operation.

5—Efficiency
The efficiency of an electric motor is high. If individual drives are adopted for machines, sections of plant can be efficiently operated whilst other sections are shut down.

6—Operating Costs
Compare more than favourably with other forms of prime movers.

Transmission Lines

HEATING

A demand for electrically-heated appliances in homes, commercial establishments and industrial enterprises has been created because of the safety, convenience, reliability and cleanliness of electricity.

Briefly, some of the outstanding advantages of electric heat over other forms of heat are:

1—Greater flexibility of application. It can be developed at or adjacent to the point of use more readily than fuel heat.
2—Easier, more accurate and reliable control of temperature.
3—Lower temperature gradient between heat source and point of use.
4—Eliminates smoke, grease, dirt, ashes, moisture, fumes and other products of combustion.
5—Can be made entirely automatic in operation.
6—Does away with fire and explosion risk, and its use frequently reduces insurance rates.
7—Makes for more comfortable, convenient and healthful living or working conditions.
8—Minimises or removes noise.
9—Often improves the product.

The domestic heating applications are less varied than the industrial ones, and are mostly cooking, water heating, or producing the warmth essential to bodily comfort. Industrial requirements are not only cooking, water heating and air heating on a commercial scale, but for innumerable other purposes, such as melting, welding, and heat treatment of metals, solderings, liquid heating, drying, electrical chemical processes, etc.

VENTILATING

The need of adequate supplies of fresh air in buildings has led to the installation of mechanical means of ventilation, and electricity is almost universally used for providing the power required for such systems. Portable, exhaust and ceiling fans of the propellor type are used to assist natural ventilation in domestic or commercial premises, and, provided that the natural ventilation is reasonably good, the fans should be capable of supplying from one to two changes of air per hour.

In buildings where a considerable number of people congregate, propellor type fans are used in conjunction with the mechanical draught system of ventilation to supply the required quantity of fresh air. The air changes per hour usually required for public buildings, etc., are as under:—

Assembly Halls	8	Offices	4
Churches	2	Schools	6
Factories	4	Theatres	1
Hospital Wards	6	Kitchens	10-15

Air filtering and reconditioning is generally required with mechanical ventilating systems, and provision must also be made to maintain the inlet air at reasonable temperature, and also that it shall be introduced in the building without causing uncomfortable draughts.

POWER DISTRIBUTION IN VICTORIA

H.T. Transmission Lines supplying Victorian towns with power from the State scheme.

ADVANCE PLANNING TO ARCHITECTS, ETC.

The Electricity Sales Branch of the State Electricity Commission of Victoria has a technical staff available for assisting architects, manufacturers, etc., in the selection of the most suitable electrical equipment for any specific service. An outline of some of the principal activities of this branch are:—

POWER.—The Power Sales Section deals with the application of electricity for power or heating purposes in factories, etc.

ILLUMINATION.—This Section functions by tendering advice on all illumination matters, and generally aims at increasing the standard and efficiency of lighting.

RURAL.—The Rural Section is devoted to the application of electricity to farming.

MERCHANDISING.—This Section covers the sale of electrical appliances for both domestic and commercial establishments.

Architects and others interested in the best utilisation of electrical apparatus are invited to communicate with the above branch of the Commission.

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31c

S A A F I N

CABLE MAKERS' ASSOCIATION

SARDINIA STREET KINGSWAY, LONDON

Manufacturers of

VULCANISED INDIA-RUBBER WIRES, CABLES AND FLEXIBLE CORDS

C.M.A. WIRES, CABLES AND FLEXIBLE CORDS

C M.A Reg. Trade Mark, Nos. 36936-7 8

History of the Cable Makers' Association

For more than 30 years the electric cable industry in Great Britain has been one of the most highly organised trades in the country, under the guidance of the Cable Makers' Association, which was founded in 1899. At that time the principal business was in rubber-insulated cables, and, as it is quite beyond the power of an ordinary buyer to determine the quality of a rubber-insulated cable by inspection, there was a great temptation in commercial competition to lower prices at the expense of quality, a fact which would not be discovered by the buyer perhaps for some years, when it would be found out with very serious and costly results. These facts being well recognised by the firms then in the industry, an association was formed, having for its primary purpose the definition of standard qualities, below which the adhering firms agreed not to go.

The next step taken by the Cable Makers' Association was to standardise sizes and descriptions of cables to be marketed and warranties to be given, and eventually it has also created common labelling systems and the marketing by trade mark and registered design, these being the property of the Association and used only by its members

Known all over the world as the C.M A., the Cable Makers' Association has elaborated a system of co-operation with the other organisations in the industry in Great Britain, such as the British Electrical and Allied Manufacturers' Association, the Lamp Manufacturers' Association, and the Electrical Contractors' Association.

Throughout the electrical industry, the C.M.A. is the recognised authority in England on all matters affecting electric wires and cables

Labelled Coils

Every coil of C.M.A. cable bears a label (in buff colour) as shown in the accompanying illustration.

In addition, the tape wound over the India-rubber core under the braid or lead has the maker's name printed continuously along its length. Users should make a point of examining both the labels on the coils and the tape around the core.

Classes of Cables

Electric light and power cables may be divided into three classes

1 Cables insulated with rubber for internal lighting, heating and power
2 Cables insulated with vulcanised bitumen, either solely, or in conjunction with fibrous materials, principally for use underground
3 Cables insulated with impregnated paper and sheathed with lead, chiefly used underground.

Rubber-insulated cables were the first and, in the early days of electrical engineering, the only cables used, and their use to-day is still very large for all purposes where high insulation and easy fixing and manipulation are primary considerations

Rubber insulation is usually applied to the tinned conductors in three stages. The first layer consists of absolutely pure rubber, without mixture of any kind. For the cable makers' processes it is essential that it should possess certain good mechanical properties, and it should be free from anything which would have a deleterious effect on the conductor.

Compound or vulcanised rubbers are usually applied in two layers, often referred to as the "separator" and "jacket," the former being usually drab in colour, and the latter grey.

These have for their bases hard fine Para or first-grade British plantation rubber, and are vulcanised with a minimum proportion of pure sulphur, and mixed with mineral matter only to the extent required for the particular grade of cable which it is intended to produce.

A lapping of waterproof tape is applied over the vulcanised rubber, and the cable is then vulcanised into a homogeneous mass

The radial thicknesses of vulcanised rubber insulation adopted as standards for various working pressures by the B.E.S.A., together with the test pressures and other standard details, will be found in the Standard B.E.S.A. Specifications.

As regards outer coverings, rubber cables may be braided and served with jute, this being the most usual finish for house wires and small cables, or they may be lead covered over the tape and armoured, if they are to be exposed to bad atmospheric or moisture conditions, or to mechanical damage Special coverings are used where special conditions have to be met

Trailing cables for portable motors, lamps, etc., are especially exposed to mechanical damage. Metallic armourings are not generally suitable for this class of work, braiding or whipcord, or lappings of tarred rope being usually preferred

Special Types of Cables

The following are several types of cables manufactured by Members of the Cable Makers' Association to meet special conditions.—

C.M.A. (REGD.) CABLE.

Insulated with Pure and Vulcanised India Rubber.

MADE IN ACCORDANCE WITH THE STANDARDS AND FORMULÆ OF THE CABLE MAKERS' ASSOCIATION

OF WHICH WE ARE MEMBERS

Guaranteed Insulation Resistance per mile after 24 hours' immersion in water at 60° Fahr., and one minute's electrification with 600 Volts _megohms

Length Size —

Megohm Grade Classification

Date of Manufacture —

C.M.A.

Registered Trade Mark Nos. 121,219-20-21

Maker's Name and Address.

Please see that this Label and Seal are intact.

OZONE-PROOF CABLES FOR EXTRA HIGH-PRESSURE WORK

With the advent of high voltages, considerable trouble has been experienced on high-pressure, alternating current circuits where vulcanised india rubber cables are used for switchboard connections and similar purposes. Numerous experiments have shown that this is due to the generation of ozone (a concentrated form of oxygen), or rather to nitrous compounds of a secondary nature, on surfaces and at the ends of the cable, which causes a rapid disintegration of the rubber.

It is impossible to state definitely at what pressure the effect of ozone is noticeable, as so much depends upon the local conditions, but broadly speaking, it may be taken that serious trouble is not likely to occur at a lower pressure than 5,000 volts, although cases have been known, where the conditions have been favourable for the generation of ozone, of trouble being experienced at lower pressures.

This difficulty, however, has been overcome by applying to the outside of the rubber a covering of special material which is not affected by ozone, and which, at the same time, does not materially reduce the flexibility of the cable.

FIRE-RESISTING CABLES

A study has been made of fire-resisting cables, and three types have been standardised, which are considered sufficient to meet ordinary requirements. These cables are insulated in the usual manner with pure and vulcanised india-rubber, and taped, being then finished as follows

(Continued on next page)

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Type 1.—Treated with special fire-resisting compound covered with one or more braidings of cotton or yarn, and treated with special fire-resisting compound overall.

Type 2.—Treated with fire resisting compound and braided with one or more coats of specially prepared asbestos yarn of much greater mechanical strength than ordinary asbestos, finally treated with fire-resisting compound. The combination of special asbestos treated with special compound produces a cable with very high fire-resisting properties.

Type 3.—Similar to Type 2, but over the asbestos braiding is placed one or more additional braidings of cotton or yarn, treated with special fire-resisting compound.

SOLID RUBBER-SHEATHED CABLES (also known as "Cab Tyre Sheathed")

For all situations where cables are subjected to very rough usage, and in consequence a strong and durable protection is necessary, solid rubber-sheathed cables are strongly recommended. Solid rubber sheathing is extremely tough and wear-resisting, it will outlast nearly all the usual forms of protective coverings for cables, while it is without many of the dangers associated with a number of such coverings. Solid rubber sheathing is smooth, uniform and clean; it will resist the actions of oils, acids, alkalis and corrosive fluids, and is unaffected by ordinary variations of temperature. It is an ideal covering for flexible trailing cables, and is largely used with electric travelling cranes, coal cutters, and in places where hard wear and rough usage are unavoidable.

DYNAMO AND MOTOR CONNECTIONS

Special flexible cables are made for these connections with tinned copper wires, insulated with pure and vulcanised india-rubber, taped, braided and compounded, or plain copper wires, cotton-covered, then pure india-rubber insulated, cotton-covered and glace braided overall, or plain copper wires, cotton-covered and glace-braided overall. The cables can also be supplied, if desired, with a soft cotton braid, shellac varnished in place of glace-cotton braid, or in the larger sizes, with a stronger braiding of coloured hemp in place of the glace cotton.

FLEXIBLE CORDS

Association, C.M.A., and all kinds of flexible cords suitable for pendant lamps, portable lights, etc., in houses, offices and workshops, are manufactured by members of the Cable Makers' Association and constructed to comply with the I.E.E. Wiring Rules, finished with silk, glace-cotton, compounded braiding spiral wire armouring, steel braiding, hard cord, solid rubber, etc.

WIRING SYSTEMS

Of late years, there has been an increasing use in private house, office and factory installations of what are generally known as "Twin Wiring Systems." Several of the leading C.M.A. manufacturers have their own standard wires, fittings and accessories for such systems, and the quality and thickness of insulation are the same as those referred to above in connection with rubber-insulated wires. While there are minor differences in detail, the main features are similar with all makers, i.e., the wiring consists of two or three rubber-insulated and taped cores laid side by side and sheathed in a flat section with special metal alloy.

The principal advantages of these surface wiring systems are ease of erection with less inconvenience to occupants or tenants, and freedom from damage to existing walls and decorations, etc. As the finished cables carry their own mechanical protection of the flexible covering of special metal alloy, the use of conduit is avoided, the resulting wiring is not unduly conspicuous when erected, and can be readily painted or distempered to match the surrounding surfaces.

Any of the Manufacturers' representatives will be pleased to furnish further details of their respective Wiring Systems.

C.M.A. Members, Branches and Agents

Members of the Cable Makers' Association can supply the highest quality V.I.R. wires, cable, and flexible cords for all purposes for which rubber insulated cables are suitable. Specifications will be prepared to meet individual requirements and the highest expert advice is obtainable from all representatives of Members of the C.M.A. in Australia. The names of the Members of the C.M.A. who are represented in Australia and of their Representatives and Agents in the various States are as follows:—

NAME OF MEMBERS OF C.M.A.	NAMES OF REPRESENTATIVES AND AGENTS.
British Insulated Cables Ltd.	Representatives—N.S.W., Victoria, Queensland and South Australia Associated General Electric Supplies Co. Ltd. Tasmania: Messrs. Oliver and Oliver Pty. Ltd. W.A.: Messrs. Chas. Atkins & Co. (W.A.) Ltd.
Callenders' Cable & Construction Co. Ltd.	Representatives—Vic., Tas., S.A. Noyes Bros. (Melb.) Pty. Ltd. N.S.W., Q'land, N'castle, Noyes Bros. (Sydney) Pty. Ltd. Agent W.A.: Messrs. J. R. W. Gardam & Co. Ltd.
Enfield Cable Works Co. Ltd.	Representative N.S.W. Enfield Cable Works (A/asia) Ltd. Sydney. Agents—Vic.: W. G. Watson & Co. Ltd. S.A.: Dankel & Co. Q'land: W. E. Peterman, Brisbane. W.A. Harris, Scarfe & Sandovers Ltd. Newcastle: W. G. Watson & Co. Ltd.
W. T. Glover & Co. Ltd.	Representatives — Vic., N.S.W., Q'land, S.A., Newcastle: The Lawrence & Hanson Electric Co. Ltd. W.A.: G. G. Martin, Perth.
The Greengate & Irwell Rubber Co. Ltd.	Representative N.S.W.—A. Beal Pritchett. Agents—Queensland: The Brisbane Electric Co. S.A.: Gerard & Goodman Ltd. Newcastle: National Elec. Engineering Co. Ltd. Tasmania: W. & G. Genders Pty. Ltd.
W. T. Henley's Telegraph Works Co. Ltd.	Representatives (Branch House) — Vic., N.S.W., Q'land: W. T. Henley's Tel. Works Co. Ltd. Agents—S.A.: Messrs. Newton, McLaren Ltd. W.A.: Messrs. Geo. Wills & Co. Ltd. Tas. Messrs. Murdoch Bros. Pty. Ltd. Newcastle H. O. McCormack.
The India Rubber G.P. & Tel. Works Co. Ltd.	Representative—Victoria W. H. Wilmshurst. Agents—Q'land: Geo. Wills & Co. Ltd. S.A.: R. C. Forbes & Co. Tasmania, Harrison Bros.
Johnson & Phillips Ltd.	Representatives (Branch House) — N.S.W., Vic.: Messrs. Johnson & Phillips Ltd. Agents Queensland Engineering Supply Co. of Aust. Ltd. S.A.: Unbehaun & Johnstone Ltd. W.A.: Unbehaun & Johnstone (W.A.) Ltd. Newcastle: J. P. Kennaway Tasmania Medhurst & Sons Pty. Ltd.
The Liverpool Electric Cable Co. Ltd.	Representative N.S.W. Liverpool Electric Cable Co. Ltd. Agents — Vic.: Warburton, Franki (Melb.) Ltd. Q'land: The Intercolonial Boring Co. Ltd. S.A. Langsford, Cooper Ltd. W.A.: Carlyle & Co. Newcastle: Martin De Launay Ltd.
The London Electric Wire and Smiths Ltd.	
The Macintosh Cable Co. Ltd.	Representative—Brooks, Robinson Pty. Ltd., Melbourne. Agent—Queensland: J. Campbell & Sons Ltd. N.S.W. Warburton, Franki (Sydney) Ltd. S.A. Colton, Palmer & Preston Ltd. W.A. W. H. Drabble Ltd.
Pirelli-General Cable Works Ltd.	Representative N.S.W., Vic., W.A. Messrs. British General Elec. Co. Ltd. Agents—Queensland Norman Bell & Co. Ltd. S.A. A. G. Healing Ltd. Tasmania A. G. Webster & Sons Ltd.
Siemens Bros. & Co. Ltd.	Representative — Victoria, N.S.W., Newcastle, S.A., Queensland Siemens (Aust.) Pty. Ltd. Agent—W.A.: H. C. Little & Co. Ltd.
Standard Telephones & Cables Ltd.	Representative — N.S.W., Victoria Standard Telephones & Cables (A/asia) Ltd.

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S.A.A. File No.

NILSEN CROMIE PTY. LTD.

Electrical Engineers

Works:
29 CROMWELL STREET, COLLINGWOOD
J 3705

FEDERAL
NILCROM
FUSE UNITS

Switch and Fuse Gear

"Federal" Fuse Units, "Federal" Ironclad Cut-Outs, "Federal" Ironclad Switch, "Federal" Combined Switch and Fuse, "Nilcrom" House Service or Pole Fuse, "Nilcrom" Junction Boxes, Earth Clips.

Manufacture

All Nilsen, Cromie products are made in Australia from materials of the best quality of their several kinds. Manufacture is under strict supervision, resulting in a finished article of the highest class as is essential to a satisfactory and safe electrical installation.

Tests

The materials used in Nilsen Cromie electrical equipment have to pass rigid inspection and tests before being used in manufacture. Also, the finished equipment is made to a definite standard both electrically and mechanically, and has been approved of for use in electrical installation by the State Electricity Commission of Victoria and electrical authorities in other States.

"Federal" Ironclad Cut-outs

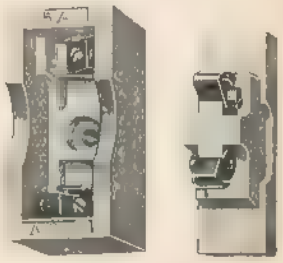
The fuse units in these cut-outs are as described on this page, all contacts being effectively shielded. The cases are provided with pin-drilled locking pin for sealing, making them particularly suitable for House Service or industrial installations. The Covers are lined with insulating material.

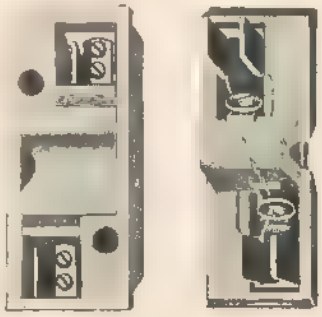
Dimensions—
15 amp.—4⅜ x 3¼ x 3 ins
30 amp.—5¼ x 3⅛ x 3¼ ins.
60 amp.—7⅜ x 4⅜ x 4¼ ins.
100 amp. 9¼ x 6 x 5⅛ ins

"Federal"
Fuse Units.

250 volts, 5 amps.
(at right)

250 volts, 30 amps., and
500 volts, 15 amps.
upwards.
(below)





Fuse Units

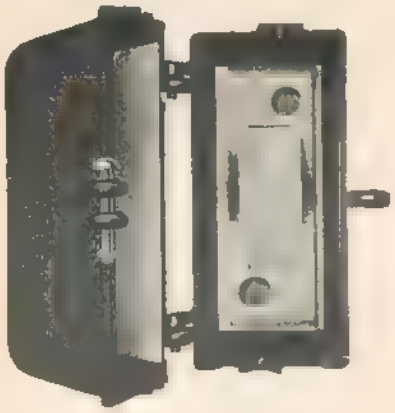
Each pattern is specially designed for the pressure on which it has to operate and it is important that the correct unit be used.

The units are made in three types:—

Type A: Arranged for connecting to busbar one end and front wiring the other, for use in Distribution Boards.

Type B: Arranged for front wiring both ends, for use in cut-outs and for general purposes.

Type C: Arranged for back connections. In the smallest size, cable entry is direct to back of terminal; the other sizes are arranged with studs and nuts for back connection.



Ironclad Cut-out with Insulated Cover.

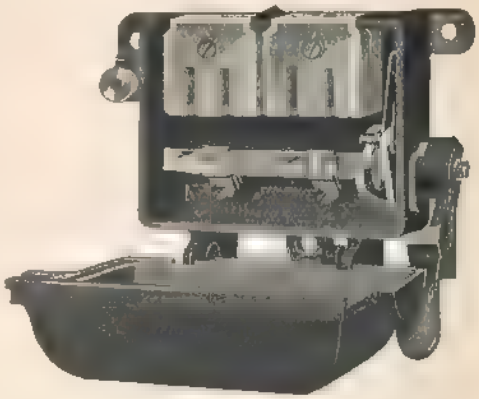
"Federal" Ironclad Switches

This switch is made in 500 volt, 2 or 3 pole types and is particularly suitable for industrial use for motor control, or for lighting and heating circuits.

The wiring is through holes in porcelain blocks, contacts being readily accessible.

Dimensions—
Double Pole
15 amp.—5⅜ x 4 x 4 ins.
30 amp. 7¼ x 4⅝ x 5⅛ ins
60 amp 9⅞ x 6⅞ x 6 ins

Triple Pole
15 amp.—7¼ x 4 x 4 ins.
30 amp. 9¼ x 4⅝ x 5⅛ ins.
60 amp.—13⅛ x 6⅞ x 6 ins.



Ironclad Switch—Quick Make and Break

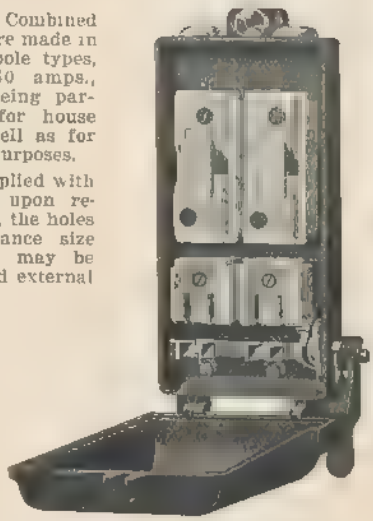
(Continued on next page)

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

"Federal" Combined Switch and Fuse

The "Federal" Combined Switch and Fuses are made in 500 volt 2 and 3 pole types, in 15, 30 and 60 amps., the combination being particularly suitable for house service work, as well as for general industrial purposes.

The switch is supplied with bushed holes, and upon removal of the bushes, the holes are standard clearance size for conduit, which may be fixed by internal and external locknuts.



Dimensions

15 amp. double pole 2-¾in. cable entry at top. Overall dimensions, 9¼ in. x 5 in. x 4 in. projector

30 amp., triple pole, 2-1 in. cable [illegible] top 17 in [illegible] x 5¼ in projector

"Nilcrom" House Service or Pole Fuse

This fuse has been designed to assist supply authorities to more efficiently handle their fusing problems, particularly in regard to private houses, shops and overhead mains. The Fuse Housing is designed with an aperture at the bottom, which enables the cartridge to be extracted and replaced by means of a forked metal head (called extractor head) which is fitted to the end of a light wooden rod. This method eliminates the use of ladders in attending to blow-outs. The Fuse has been designed in two types: universal type, suitable for either horizontal or vertical attachment; and the Pole Bracket type, suitable for pole or vertical attachment only.

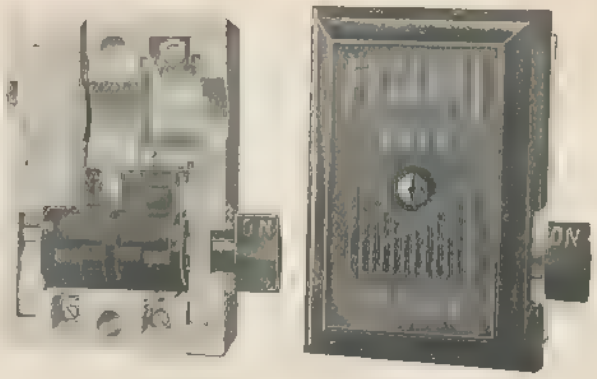
These fuses have been standardised by a large number of supply authorities, including State Electricity Commission of Victoria, Rockhampton City Council and Brisbane City Electric Light Co., Queensland, Perth Electricity Dept., W.A., and Auckland and Marlborough Power Boards in N.Z.

Pole Fuse—Bracket Type

Neutral Links and Bars

Neutral links (see illustration) are made from ½ in. by $\frac{1}{16}$ in. brass rods to take five tappings, supplied complete with a neat cast iron, stove-enamelled cover.

Neutral bars—made to the specification of the S.E.C. for their multiple earthed neutral system—are supplied in single, double and triple circuits for lighting; also in three circuit lighting and two circuit power.



"Federal" Insulated Switch and Fuse Combination

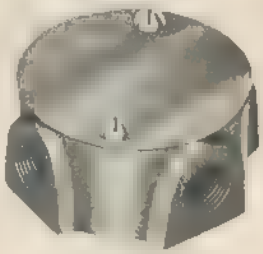
250 Volts, 10 Amps. Quick Make and Break. Double Pole only.

This all insulated fuse can be used on any wiring system without earthing. The switch is fitted into a one-piece porcelain base, and cover and switch handle are made of bakelite. Provision is made for sealing cover.

For small house service work this combination is most popular and least expensive available. It is made up for both front and back wiring. Weight, 1¼ lbs., measurements, 4⅜ in. x 3½ in. x 2½ in.

Junction Boxes

Junction Boxes are watertight units for built-in outlets, and are used in the best class of conduit work when a pull-in job is desirable. They are made from grey cast iron with boxes to take one, two, three or four-way circuits, boxes are covered with a 20 S.W.G. mild steel lid. Round boxes (see illustration) are made to fit ⅝ in., ¾ in. and 1 in. conduit.



C.I. Junction Box.

Flush Switch Mounting Boxes

For effective protection, flush switches are mounted in boxes set into the wall. A screwed connection is made with the conduit and thus a watertight and well-grounded system is completed. These boxes are made in cast iron and are drilled and tapped to take the standard flush switch and flush plug. Inlets are drilled to take ¾ in. screwed conduit.

Neutral Link with Cover.

Earth Clips

Used for ensuring adequate and safe grounding of conduits. "Nilcrom" earth clips are made up from the best quality galvanised hoop iron, 1 in. by 18 S.W.G., in accordance with the S.E.C. and F.U. Rules for installation. No soldering is required, screw and nut are sheridized.

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S.A.A. File No.

THE ASSOCIATED GENERAL ELECTRIC INDUSTRIES LTD.

N.S.W.—The Associated General Electric Industries Ltd., 95 Clarence Street, Sydney; and at Keen Street, Lismore, 53 King Street, Newcastle.

VICTORIA The Associated General Electric Industries Ltd., 108 Queen Street, Melbourne

S.A.—The Associated General Electric Industries Ltd., 27 Grenfell Street, Adelaide.

QUEENSLAND — The Associated General Electric Industries Ltd., Kelvin House, Adelaide Street, Brisbane; and at 158 East Street, Rockhampton; Flinders Street East, Townsville.

W.A.—Agents:—Messrs. Atkins (W.A) Ltd., 894 Hay Street, Perth.

TASMANIA — Agents:—Messrs. Oliver and Oliver Pty. Ltd., 9 Argyle Street, Hobart; and at Quadrant, Launceston.

[For Other Products, See Index]

SHOW WINDOW LIGHTING

X-Ray Reflectors

X-Ray focal point reflectors are designed with scientific accuracy to efficiently produce a required distribution of light. The completeness of the line provides light control to meet every requirement.

X-Ray reflectors are blown in one piece from the highest quality glass Designed with a double system of radial and special corrugations and coated with pure metallic silver they deliver a light beam of remarkable smoothness. The exteriors of these reflectors are finished with "Silvertone," a protective silver finish.

Lighting Guarantee

An installation of X-Ray Reflectors will be found in practically every important store in Australia, and our experience with these installations over a long period of years enables us to guarantee complete satisfaction, providing the reflectors are correctly installed, and used at rated capacity.

Design of Show Window Lighting

The number of reflectors to use is optional. No set rule can be established. It is influenced by a number of conditions, such as the brightness of neighbouring windows, the intensity of the street illumination, kind of goods on display, and largely the extent of the user's realisation of the advertising and selling value of bright windows.

The closer the reflectors are spaced, the brighter becomes the light in the window, and vice versa. For the average installation, the spacing or distance from centre to centre of the reflectors, is from 12 to 24 inches. Under *ordinary conditions, large windows* should be lighted with No. 500 or No. 510 reflectors with 200-watt Mazda lamps. For *medium-sized windows*, No. 400 and No. 410 reflectors, using 150-watt Mazda lamps, should be installed.

Distributing Type Reflectors

X-Ray reflectors of the distributing type are recommended for windows having a depth greater than half their height. They should be used for any high trim window or if it is desired to project the light back into the shop

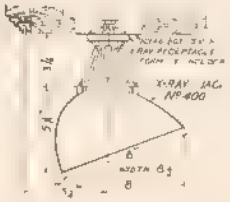
No. 400. "JACK"

For windows less than 8 ft. high and having depth greater than half the height.

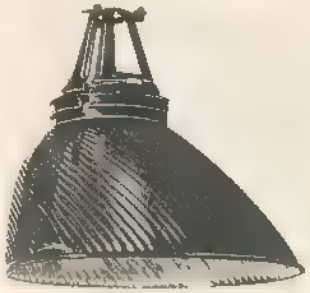
No. 500. "KING"

For windows 8 ft. or higher, having depth greater than half the height.

See above for wattage of lamps to be used to suit both types.



Concentrating Type Reflectors



Reflectors of the concentrating type are recommended for windows having a depth less than half the height or for low trim windows. This type of reflector should be used in open windows when the light is not to be reflected back into the shop.

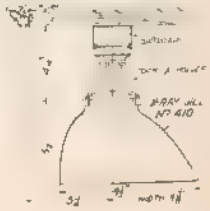
No. 410. "JILL"

For windows less than 8 ft. high and having depth less than half the height.

No. 510. "QUEEN"

For windows 8 ft. or higher having depth less than half the height.

See above for wattage of lamps to be used



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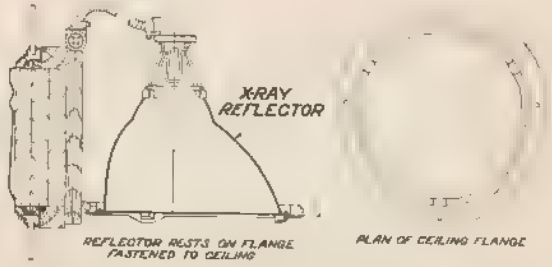
Recessing Equipment (Ceiling Flanges)

To provide flush mounting of the reflectors, X-Ray ceiling flanges consisting of metal rims are available for recessing the reflectors. They are made of stamped metal provided with four holes for screws for attaching to ceiling. They are supplied unfinished. Where No 400 or No 500 reflectors are used, it will be noted that they are cut off at an oblique angle. To set these successfully it is necessary to construct the ceiling with a dip towards the window

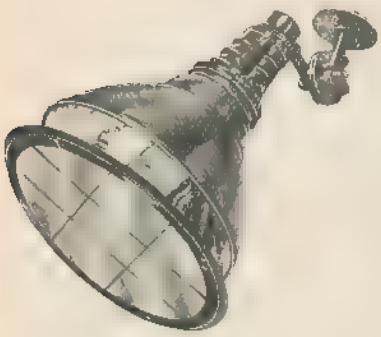
When recessing X-Ray reflectors, it is necessary that the opening in the ceiling be cut to the proper contour. Obtain either a template drawing or a sample flange, before cutting openings.



Show Window Colour Lighting

Certain types of displays are very effectively shown under coloured lights When it is used with discretion, colour lighting will produce results with greater attractive power than white light can possibly have Each installation of X-Ray window reflectors and floodlights should be equipped with X-Ray "Colour Ray" attachment consisting of a light metal frame with spring clips for fastening to each reflector and four sheets of gelatine in red, amber, green and blue. These colours can be blended very effectively, especially with the use of X-Ray floodlights

SHOW WINDOW AND INTERIOR FLOODLIGHTING



No. 33A. "FLOOD-RAY," with Colour Equipment

Is used to concentrate a "centre spot" beam and flood of light on a display. Regularly supplied with colour equipment Use 200-watt Mazda lamp

With a centre spot-beam, for concentrating a high intensity of light upon a single object while brilliantly lighting a larger surrounding area at the same time, X-Ray floodlights are ideally suited for many uses, in show windows and other interiors they are now considered a standard article of equipment for all show windows.

All X-Ray floodlights are equipped with swivel bases to allow the unit to be directed as desired Colour frames are standard equipment although floodlights are obtainable without colours. All exposed surfaces are finished in green, providing a neat appearance

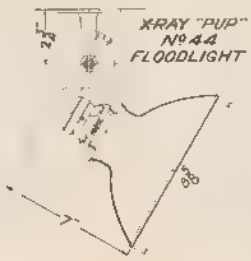
CONTROL RING

Soon after the window floodlight with centre spot-beam was originated, it was discovered that the users frequently desired a strong narrow beam (of white or colour) without the accompanying wide spread of spill light The X Ray Control Ring eliminates this spill light and leaves only the beam Colour frames which are standard equipment for the floodlight, are not interfered with while the control ring is in use

Control rings are only used with Nos. 33 and 88.

No. 44. 'PUP'

A small floodlight which concentrates a smooth narrow beam. Use 100-watt Mazda lamp.



No. 88. "HIPPO," with Control Ring in place

A high intensity floodlight for producing a wide spread of light with a powerful "centre spot-beam." Regularly supplied with colour equipment. Use 300 or 500 watt Mazda lamp.

(Continued on next page)

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

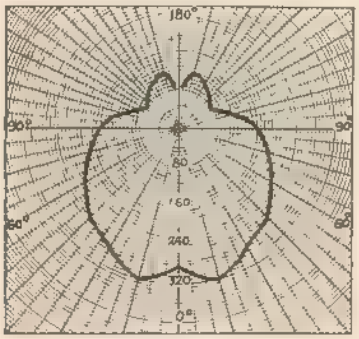
COMMERCIAL LIGHTING

Complete Commercial Lighting Service

The first requirement of a lighting system is to provide enough light for comfortable vision in the performance of the work at hand, whatever it may be. An abundance of light without glare is the simple but classic recipe.

A good commercial lighting unit consists of an enclosing globe of diffusing glassware of the right density and contour to absorb the minimum amount of light and to direct the maximum amount where it will be most useful, and of an attractive and well constructed fixture to support the globe securely and hold the lamp in the correct position, such is the construction of the three different pieces of Ivanhoe glassware illustrated below.

THE IVANHOE "TROJAN"



How the "Trojan" distributes light.

Distributing diffused light above and below the mounting plane, it produces pleasing, delightful illumination in all directions without sharp shadows or annoying glare.

Where Used

It is suitable for the lighting of offices, stores, schools and all similar interiors.

For most desirable results, the Trojan should be spaced one and a half times the mounting height above the working plane.

THE IVANHOE "TROJAN"

IVANHOE "TROJAN" SIZES AND DIMENSIONS

Number of Glass	Dimension in Inches			Recommended Mazda C Lamps. Watts.
	Diameter	Depth	Fitter	
5264 x 9 Genco	9	5¾	4	75–100
5264 x 9 Genco 466	9	5¾	4	75–100
5264 x 9 Genco 467	9	5¾	4	75–100
5264 x 9 Genco 501	9	5¾	4	75–100
5264 x 12 Genco	12	7¾	4	100–150
5264 x 12 Genco 466	12	7¾	4	100–150
5264 x 12 Genco 467	12	7¾	4	100–150
5264 x 12 Genco 501	12	7¾	4	100–150
5264 x 14 Genco	14	9	6	150–200
5264 x 14 Genco 466	14	9	6	150–200
5264 x 14 Genco 467	14	9	6	150–200
5264 x 14 Genco 501	14	9	6	150–200
5264 x 16 Genco	16	10¼	6	200–300–500
5264 x 16 Genco 466	16	10¼	6	200–300–500
5264 x 16 Genco 467	16	10¼	6	200–300–500
5264 x 16 Genco 501	16	10¼	6	200–300–500
5264 x 18 Genco	18	11¼	8	300–500–750

Note.—The proper lamp for a globe of a given diameter depends entirely upon its application. A larger lamp will increase surface brightness. Excessive brightness interferes with vision.

THE IVANHOE "ACE"

The Ivanhoe "Ace" is made of one piece of crystal glass so finished as to diffuse the light and prevent glare with but very little light absorption. The deflector, fitted over the top opening inside the holder, reflects downward light that would otherwise be lost.

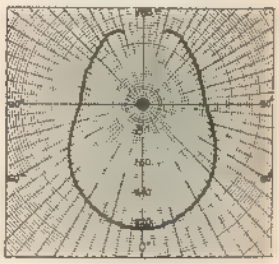
Where Used

This unit is recommended for all kinds of commercial lighting where reflection factor of ceiling is not high, and is used with Mazda C lamps.

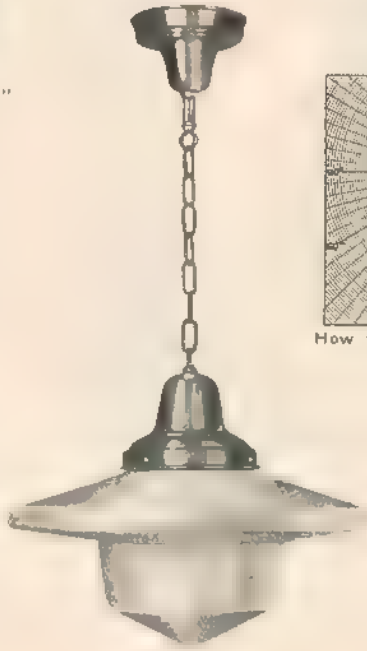
For most desirable results, the "Ace" should be spaced 1½ times the mounting height above the working plane.

SIZES AND DIMENSIONS

Number of Glass	Dimensions in Inches			Recommended Mazda C Lamps. Watts.
	Diameter	Depth	Fitter	
5108 x 14 CE	14	7⅞	6	100–150
5108 x 17 CE	17	9¼	6	200–300
5108 x 20 CE	20	10⅞	8	300–500



How the "Ace" Distributes Light



THE IVANHOE "ACE"

(Continued on next page)

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INSTALLATION DATA (FOR "TROJAN" AND "ACE")

The following table is provided as a guide in deciding the quantity of light desirable for offices and other locations

Type of Installation	Degree of Illumination—Foot Candles: Recommended	Under some conditions
Auditoriums, Churches	3	2-4
Hospitals		
Corridors	2	[illegible]
Operating Room (Table)	[illegible]	[illegible]
Ward Rooms, Private Rooms, General Lighting supplemented by Local Lighting	[illegible]	2-4
Offices		
Private, General	[illegible]	6-12
Drafting Rooms	1	10-20
Public Halls	[illegible]	3-6
Restaurants, Lunch Rooms	[illegible]	4-10
Schools — Class Rooms, Study Rooms, Library	8	[illegible]
Show Rooms	10	6-12
Shops		
Show Windows	10-70	
Main Floor Department Shops		
Shops on Bright Corners	10	6-12
Other Shops: Clothing, Dry Goods, Haberdashers, Millinery, Jewelery, etc.	8	5-10
Other Stores: Chemist, Grocery, Meat, Bakery, Furniture, Confectionery, etc.	6	4-8

WATTS PER SQUARE FOOT FACTORS

The following table shows the watts per square foot required to obtain various foot-candle intensities with the "Trojan" and "Ace," with Mazda C Clear Lamps.

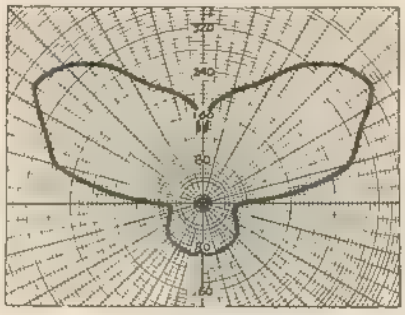
Class of Illumination as expressed in Foot Candles	One Row of Units: Light Walls and Ceiling, Watts per Sq. Foot	One Row of Units: Dark Walls and Ceiling, Watts per Sq. Foot	More than One Row of Units: Light Walls and Ceiling, Watts per Sq. Foot	More than One Row of Units: Dark Walls and Ceiling, Watts per Sq. Foot
1	2[illegible]	33	.21	25
[illegible]	.5	[illegible]	[illegible]	48
[illegible]	7[illegible]	84	[illegible]	63
[illegible]	[illegible]	1.10	[illegible]	82
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	3[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	75	[illegible]	[illegible]	59
[illegible]	[illegible]	[illegible]	7	1.85
2	5[illegible]	[illegible]	[illegible]	2.29
[illegible]	[illegible]	[illegible]	[illegible]	2.8[illegible]

THE IVANHOE "KELDON"

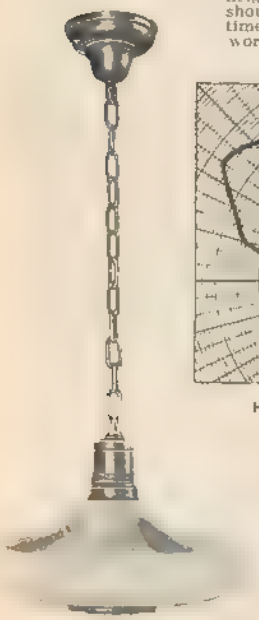
From the standpoint of maintenance the "Keldon" has two outstanding features:—(1) being totally enclosed, it does not suffer reduced efficiency through the accumulation of dust; (2) the lamp can be removed or replaced without removing the globe from its holder; the lamp and socket become quickly accessible by the removal of the bottom cap.

Where Used

Recommended for offices, drafting rooms, reading rooms, schools, hospitals, and all other places where lighting of high intensity with diffused light is essential. 55 per cent. of the light is directed toward the ceiling and 17 per cent. downward. The distance of the units from the ceiling should be approximately one-sixth the height of the ceiling. The spacing should not exceed one and one-half times the mounting height above the working place.



How the "Keldon" distributes light.



THE IVANHOE "KELDON"

SIZES AND DIMENSIONS

Number of Glass	Dimensions in Inches: Diameter	Depth	Recommended Mazda C Lamps Watts.
570	[illegible]	6¾in.	100-150
536	16in.	6¾in.	200
5363	8in	7¾in.	300-500

INSTALLATION DATA

The following table shows the watts per square foot required to obtain the various foot candle intensities with the "Keldon" and Mazda C Clear Lamp. (*Light ceilings 70 per cent., Medium walls 40 per cent.)

Foot-Candles	Small Rooms (16ft. x 16ft.) 9ft. to 10ft. Ceilings	Medium Rooms [illegible] x 12ft [illegible]	Large Rooms (100ft. x 100ft.) Ceiling Height—10ft or more
1	1.25	.92	78
[illegible]	1.65	1.23	1.04
[illegible]	1.85	1.37	1.16
8	2.50	1.84	1.55
[illegible]	3.1[illegible]	2.28	1.94
12	3.7[illegible]	2.72	2.32
16*	4.3[illegible]	3.61	3.10

*Ivory white, white or other colours having a reflection value of 70 per cent. or more are preferable for ceilings, and may be classified as light. Medium colours, such as Ivory, Tan Buff, also some Greens and Greys, having a reflection factor of 50 per cent. or more, may be used for walls. Ample allowance has been made for windows and doors in determining the reflection factor of 40 per cent. for walls. Sufficient allowance has been made to cover depreciation which might be expected under average conditions where lighting equipment is cleaned three or more times a year.

(Continued on next page)

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INDUSTRIAL LIGHTING

Correct Illumination an Aid to Industrial Efficiency

Good illumination has helped to point the way toward increased production, decreased spoilage, improved working conditions, fewer accidents, and a general improvement in industrial efficiency.

All industrial lighting may be divided into three classes.—General Overhead Lighting, Group Lighting, and Local Lighting

IVANHOE REFLECTORS

Ivanhoe reflectors are stamped or drawn of deep drawing steel. The finish of the Ivanhoe standard line of industrial equipment is porcelain enamel. This finish will stand up under dirt, moisture, and acid fumes with little if any deterioration of the reflecting surface. They are easy to clean—always an important consideration in the purchase of industrial lighting equipment.

R.L.M STANDARD DOME REFLECTORS

This type of reflector fulfils the requirements of the majority of lighting installation.

These reflectors are generally applicable to any industries which may be classified as Rough, Medium or Fine manufacturing. The depth of the R.L.M. standard dome is such that ample protection from glare of the lamp filament is provided when the reflector is used at the average mounting height.

When used for General Overhead Lighting, the distance apart should not exceed one and two-thirds times the mounting height above the work to insure uniform illumination. This rate can be increased to two or two and one-half where uniform illumination is not required, as in warehouses and spaces where rough work is performed.

R.L.M. Standard Domes are available as follows:—

Catalogue Name	Dimensions—Inches			Recommended Lamp Wattage
	Diameter	Depth	Fitter	
Bedd 100	12in.		2¼in.	75–100
Bedd 150	14in.		2¼in.	150
Bedd 200	16in.		2¼in.	200
Redd 500	18in.		with Mogul Socket	300–500

STANDARD BOWL REFLECTOR

Rules for the installation of the bowl type reflector are very closely related to those given for the dome type, but with this type the lamp filament is shielded at a lower angle. They are especially suitable for installation where reflectors must be mounted low so that operators will not be annoyed by excessive glare.

Bowl reflectors should be spaced a distance apart, approx one and two thirds times the mounting height above the work for either General Overhead or Group Lighting, and when used for Local Lighting, must, of course, be located with reference to the work.

These reflectors are available as follows:—

Catalogue Name	Dimensions—Inches			Recommended Lamp Wattage
	Diameter	Depth	Fitter	
Beh 60	7½in.	5in.	2¼in.	60
Beh 100	8½in.	6⅝in.	2¼in.	75–100
Beh 150	9½in.	7⅝in.	2¼in.	150
Beh 200	10½in.	8⅝in.	2¼in.	200
Reh 500	12½in.	13in.	with Mogul Socket	300–500

STANDARD ANGLE REFLECTOR

Angle type reflectors are particularly desirable in locations where the Overhead Lighting often comes from reflectors mounted rather high, and it is necessary to build up from the side the illumination on the working plane.

In the smaller sizes this type is good for Local Lighting. Angle reflectors are also used extensively for sign and billboard lighting.

Angle reflectors are available in the following sizes:—

Catalogue Name	Dimensions—Inches			Recommended Lamp Wattage
	Diameter	Depth	Fitter	
Bel 60	7in.	5⅝in.	2¼in.	60
Bel 100	8¼in.	6⅝in.	2¼in.	75–100
Bel 150	10½in.	9¼in.	2¼in.	150–200
Rel 500	12½in.	11⅝in.	with Mogul Socket	300–500

IVANHOE GLASSTEEL DIFFUSER

The Glassteel Diffuser, designed for high wattage Mazda C Lamps, is a combination consisting of an extra large dome reflector and an enclosing globe of light density opal diffusing glass that entirely surrounds the lamp. The top of the reflector has perforations, through which light passes upward so that the entire workroom may be lighted. Its outstanding features are: (1) provides the highest quality lighting, (2) dust proof and dirt-proof, (3) entire unit easily cleaned in place, and (4) mounting can be recessed when desirable.

(Continued on next page)

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It is recommended for General Overhead and Group Lighting, or where light of high intensity is essential, or where direct or reflected glare must be eliminated

IN PRINTING AND LITHOGRAPH PLANTS

Where illumination requirements call for colour value which more closely approximates daylight, the Trutint glass globe should be used.

For uniform illumination, the Glassteel Diffuser should be spaced not more than one and one-half times the mounting height above the work.

It is available in the following sizes:—

Catalogue Name	Dimensions—Inches			Recommended Lamp Wattage
	Diameter	Depth	Fitter	
962	18in.	10¾in.	Solid top w/- Socket	150–200
963	20¾in	13¼in	Solid top w/- Socket	300–500

VAPOUR-PROOF EQUIPMENT

Vapour-proof fittings afford a safe installation for powder plants, flour mills, oil refineries, and similar industries where electrical connections and lamps must be protected from acid fumes or inflammable dust and vapour The R.L.M Dome has been adapted for use on these fittings, therefore the performance characteristics are very similar. They should be spaced not to exceed one and two-thirds mounting height above the work

The following sizes are available

Catalogue No.	Diameter Inches	Depth, Inches.	Lamp Wattage.	Remarks.
[illegible]	14	1[illegible]	100-150	w/ Reflector
971	[illegible]	11[illegible]	100-150	No Reflector
[illegible]	[illegible]	1[illegible]	200	w/ Reflector
[illegible]	[illegible]	14[illegible]	300-500	w/- Reflector
[illegible]	[illegible]	11	75-100	Angle type

DATA

For minimum foot-candles required to give satisfactory illumination for various services, see index to tables

WATTS PER SQUARE FOOT REQUIRED FOR DIFFERENT INTENSITIES

Intensity in Foot Candles	Type Lamp	Watts Per Square Foot With Various Types of Reflectors					
		One Row of Outlets			More Than One Row of Outlets		
		R L M Dome	Bowl	Glassteel Diffuser	R L M Dome	Bowl	Glassteel Diffuser
1	Mazda C Clear or Inside Frost	19	23	.22	.15	.19	.20
2		36	44	43	29	35	35
3		52	61	6[illegible]	.42	50	49
4		64	79	.78	.52	.65	.65
5		81	95	.93	.65	.78	.75
6		97	1 15	1.10	78	.94	.90
8		1 29	1 50	1 45	9[illegible]	1 20	1 15
10		1 45	1 80	1 [illegible]	1 29	1 45	1 4[illegible]
12		1 80	2 15	2 10	1 45	1 7[illegible]	1 7[illegible]
16		2 30	2 70	2 65	1 85	2 20	2 10
1	Mazda C Bowl-Enamelled	22	26		19	23	
2		43	51		35	42	
3		60	72		49	59	
4		78	93		.65	78	
5		93	1 11		75	90	
6		1 10	1 32		90	1 08	
8		1 45	1 74		1.15	1 38	
10		1 75	2 10		1 40	1 68	
12		2 10	2 51		1.70	2 04	
16		2 65	3 17		2.10	2 40	

SPACING AND MOUNTING-HEIGHT TABLE

Mounting-Height Above Floor. Feet.	Minimum Spacing Distance Between Outlets (For Plane 30 inches above the Floor)		Spacing Outside Outlets to Wall.	Mounting-Height Above Floor Feet.	Minimum Spacing Distance Between Outlets. (For Plane 30 inches above the Floor)		Spacing Outside Outlets to Wall
	R L M Standard Dome or Bowl Type. Feet.	Glassteel Diffuser. Feet.	Bench or Machine Next to Wall. Work		R L M Standard Dome or Bowl Type Feet	Glassteel Diffuser Feet	Bench or Machine Work Next to Wall.
9	11	10	3	13½	18	16½	5
9[illegible]	12	10½	3	14	19	17	5½
10	12½	11	3½	14½	20	18	5½
[illegible]	13	12	3½	15	21	19	6
11	14	13	4	16	22½	20	9
11½	15	13½	4	17	24	22	[illegible]
12	16	14	4½	18	26	23	[illegible]
12½	17	15	4½	19	27½	25	8
13	17[illegible]	16	[illegible]				

(Continued on next page)

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General Electrical System

The Associated General Electric Industries Ltd. offers a complete, comprehensive electrical system to meet the varied requirements of present-day practices, and not merely a collection of apparatus and material Some of the element of the G E system are described in this and other pages of this Catalogue

G.E. Wiring Services

A complete range of wiring devices and accessories to suit every type of wiring requirement is stocked. A list of these devices is as follows:

Adaptors

Mounting Blocks

Porcelain Ceiling Roses

Lampholders, brass and porcelain (bayonet, Edison and Goliath screw)

Switches (surface, flush, rotary, pull)

Complete and varied line of Flush Cover Plates

Flush Receptacles

Switch Plugs (2 and 3 pin)

Wall Plugs (2 and 3 pin) and Tops

Conduit (slip and screwed, black enamelled and galvanised)

Conduit Fittings

British Insulated C.M.A. Wires and Cables

Metal Manufacturers' Bare Copper Cable

Moulded Bayonet Lampholders

Moulded Bayonet Lampholders with shade carrier supplied in ¾in., 9in. Cord Grip.

These holders are neatly moulded, convenient in size, and present a distinct appearance. Solid plungers possessing high electrical and mechanical qualities are fitted The springs are non-rusting, have adequate tension and will not suffer under heat

MOULDED WALL PLUGS AND RECEPTACLES

Two or 3-pin plugs moulded from a high grade insulating medium, ensuring adequate protection from shock

Efficient cord grip combination that eliminates strain on conductors and reduces risk of short to a minimum

Receptacle moulded from similar material and is suitable for either flush or surface work.

Receptacles are supplied both in 2 and 3-pin types. In the 3 pin type the provision of a longer earth pin ensures that earth connection is made before and broken after circuit connection The size of earth pin makes it impossible for connection to be wrongly made

G E. Two-gang Flush Plate in Metal

SURFACE SWITCHES.

G.E. Surface Switches are obtainable with metal or bakelite covers indicating handles are standard Available sizes are 3 amp. and 5 amp., single pole and 2-way, 10 amp. and 20 amp., double pole and 2 way

Ceiling switches of similar construction are available in 3-amp., 5 amp., and 10-amp., 20 230 volts, 8 ft. of cord and ball furnished with each switch.

All these switches are completely insulated and are suitable for the usual building—they may be semi-recessed (porcelain portion only) into architrave, if desired

FLUSH SWITCHES.

G.E. fully recessed switches of porcelain bases with insulated self-indicating handles are sturdy but inconspicuous fixtures—operate with the sweep of the finger, arm or elbow Positive start, quick make-and-break mechanism assures smooth and positive operation and freedom from sticking or burning of contacts. Available as single-pole, 5 amp.; double-pole, 10 and 20 amp. 3-way and 4-way

These recessed patterns are completed with metal plates in various finishes or moulded materials—combination plates with any arrangement of units can be supplied

Use flush plates and recessed fittings in all high-class buildings

G.E. Combined Flush Switch and Plug with Moulded Cover

G.E. Moulded Flush Switch with Plate

G E Flush Plate for Combination Switch, Plug and Pilot Light

G.E. Combination Flush Switch and Plug.

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FLOODLIGHTING PROJECTORS

Floodlighting—An Important Factor in Modern Building Design

An Architect's experience and taste enable him to prevail over the most disadvantageous site and surroundings—to adapt his design to the conditions imposed by adjacent structures and topography and, despite all, to impress his fabric with the effect and beauty of his conception. But he must contend with darkness. Night veils his creation—not only the fine details, but, to a large extent, the general lines—and all its grace and power are lost during the hours when most men find their only leisure to admire the art of its design and to appreciate the embodied suggestions of the purpose for which it was erected.

Illumination engineers have arrived at a system of floodlighting that literally wrests buildings and monuments from the powers of darkness, that utilises surrounding shadow to emphasise the charm and dignity of the structure, that gives rightly force to its eloquent message, that projects it against the sky and compels the admiring attention of throngs who must otherwise pass by in ignorance of its worth.

By the scientific control of floodlights it is possible either to bathe an entire building in their rays and make it a monument of white beauty or to pick out unusual architectural features for the study of those who appreciate artistic distinction. With the whole spectrum at command, tints may be introduced where they will be of effect and shadows may be cast that will give depth and significance to facade and colonnade.

These comprehensive applications of floodlighting have met such wide approval that many architects, builders, and owners are now deeply interested in designs and materials that will especially lend themselves to night illumination. Architects, in particular, are bending their talents to the incorporation of structural details that will be in artistic keeping with floodlighting developments. They are adopting hitherto unused tints of terra cotta, brick, and stone for the sake of their effect under the concentrated beams of floodlighting projectors. Floodlighting has become an instrument of architectural art.

The Manifold Uses of Floodlighting

The possibilities, and the practical uses, of floodlighting are unlimited. Following are a few of the many applications that have been made both in architectural and industrial fields:

Monumental buildings	Towers
Business blocks	Petrol filling stations
Building fronts	Automobile show rooms
Public buildings	Industrial plants
Athletic grounds	Grain elevators
Outdoor theatricals	Power stations
Monuments	Construction work
Fountains, etc.	

ST. KILDA WAR MEMORIAL. Flood Lit with Projectors Supplied by A.G.E.I. Ltd.

TOWN HALL, SYDNEY
Flood lit with 30 Novalux Projectors supplied by A.G.E.I. Ltd.

Novalux Floodlighting Projectors

The G. E. NOVALUX Floodlighting Projector is the finest ever produced. Bronze, brass and copper are used exclusively in its construction, the result being an entirely non corrosive unit. The excellent heat radiation provided by the copper housing makes possible the elimination of ventilation. Thus the projector is completely sealed from the atmosphere, preventing the internal collection of dust.

The many unique features of design have led to the general adoption of the Novalux Floodlight by Government and Municipal bodies throughout Australia. For use near the ocean or localities where atmosphere conditions are severe, the bronze construction is essential to long life and maintenance of high efficiency.

Only three sizes of casings for all types of light distributions with lamps from 200 to 1,000 watts, either general service or floodlighting.

All casings of non ferrous metal. All parts non rusting. Excellent heat radiation permitting small dimensions. Light in weight because of the material used in construction. Reduces installation cost.

Asbestos gasket does not vulcanise nor carbonise as in the case of rubber, resulting in extremely long life and weather proof qualities. Ease and accuracy in focusing through the use of unique universal focusing mechanisms.

Simple and economical mounting possible because of small three point base design and swivel mounting. Installation of projector and orienting of beam facilitated.

All units totally enclosed, thereby preventing dust and dirt from entering and impairing efficiency.

Clear lenses with plain, lightly stippled, heavily stippled, spredlite and asymetric distribution, coloured lenses with plain and heavily stippled distribution.

Colour plates of red, amber, blue, or green in two sizes for use with clear lenses.

All reflectors are of silver plated glass protected by copper backing. Glass reflectors provide the most efficient type of projector, much more efficient than aluminium or chromium plated reflectors. Projectors of same size have interchangeable reflectors.

Practically any type of light distribution can be obtained with the proper combination of reflector and lens.

The L 29A and L 29B are small in size and particularly adapted for mounting where the available space is limited.

The L-30A and L-30B are very compact units and may be mounted in small spaces.

In addition to the range of projectors mentioned above, the Form L.1 projector is also obtainable. This unit has an adjustable base and a door frame of cast iron and is equipped with a polished aluminium reflector. Clear, stippled or spredlite lenses are available in order to obtain the correct light distribution. Lower initial cost and excellent efficiency over a period of years is assured. 500-watt floodlighting lamps are used.

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S.A.A. File No.

THE LIGHTING SERVICE BUREAU
of PHILIPS LAMPS (A'SIA) LIMITED

HEAD OFFICE 69-73 Clarence Street, Sydney. - - - - - - - BW 2121.
BRANCH OFFICES—354 Post Office Place, Melbourne. - - - - M 3191
Hayward Building, Charles Place, Adelaide. Central 6843.
Perry House, Elizabeth Street, Brisbane. - - B 7462.

ILLUMINATION ENGINEERING DATA

Fundamental Principles of Light and Sight

Light is that form of energy which by its action upon the organs of vision enables them to perform their function of sight.

The influence of artificial light is experienced in many ways In the first place, light lends character to our surroundings, and is a factor in the creation of moods or what we more commonly describe as "atmosphere." Popular instances of this are given in the methods of lighting churches, theatres or restaurants.

The influence of light, however, becomes more noticeable in its power to enable us to distinguish objects and perceive detail.

Where the creation of atmosphere is the chief consideration, the efficiency of the lighting source is of secondary importance; but where lighting is to be used as a means of distinguishing, the primary importance is to get as much out of the lighting source as we possibly can.

Now, in order to get the best out of our lighting, it is necessary that we (1) appreciate the physical act of seeing; (2) understand what the seeing requirements are in individual cases; (3) have a knowledge of light adaptation in conjunction with the placing, spacing and mounting of light sources, together with reflecting or diffusing methods to be employed for any desired result. The two latter points will be dealt with under three general headings, but we may here briefly review the first point.

Light is largely based on the varying reflective capacities of the objects which come within the range of vision This variation must be preserved, particularly in the case of objects of one or no colour, as if the light intensity is the same on every particle of surface area, there would be no contrast, without which the eye would be unable to distinguish form, shape, or detail.

Denomination of Units

(a) **The Unit of Luminous Intensity is called a "Candle"** (one candlepower).—In the case of a "uniform" source of light (glowing bulb), the luminous intensity is the same in all directions (see Fig. 1). The arrows indicate a number of candles. In this case the arrows are the same length, therefore the luminous intensity is the same in all directions.

Fig. 1.

Fig. 2.

Now we can connect the arrow heads in a curved line, which, in the case of Fig. 1, becomes a circle (Fig. 2).

In the case of some incandescent lamps, the luminous intensity is not equally strong in all directions, but show uneven emission (see Fig. 3). A curve of this light emission is shown in Fig. 4

Fig. 3.

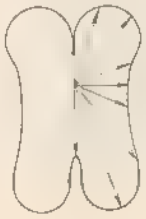


Fig. 4.

(b) **Lumen.**—The lumen is the unit of light flux. It is the total amount of light intercepted by a surface of one square foot, every point of which is at a distance of one foot from a point source having an intensity of one candle. The total flux emitted from a uniform light source of one candle is 12 57 lumens

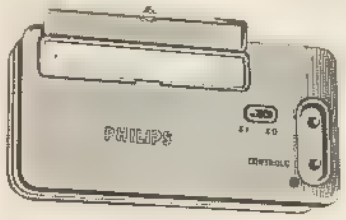
(c) **Foot Candle** is the unit of intensity of illumination When one lumen falls on an area of one square foot, the average of intensity on that plane is one foot candle

The farther away from the light source a plane is held, the smaller becomes the intensity of illumination, which diminishes in proportion as the square of the distance.

(d) **Coefficient of Utilization.**—This is the proportion of the lumens produced by the lamp which reach the plane of work. It takes into account the losses due to light absorption on the walls, ceiling, and fitting used

(e) **Depreciation Factor.**—This is the factor which allows extra initial illumination to compensate for the falling off in reflecting efficiency of the reflectors, walls, and ceiling, due to deterioration and the collection of dirt and dust. A depreciation factor should always be applied, since calculations for lighting are made for ideal conditions of cleanliness, service, etc. At the same time, it must always be borne in mind, that such a factor does not allow for inefficient maintenance.

Foot-Candle Measurement



The light emitted by the lamp may be described as "raw light," and must not be confused with the effective illumination that is required at the working point.

The user of light is not so much concerned with the candle power of the light source, as the resultant illumination on the desk, counter, or machine

Illumination can now be as readily measured as the temperature of a room, the unit of measurement being the foot-candle, and the instrument the Philips Foot-candle Meter. This portable meter is a small pocket size instrument, having an illuminated calibrated scale from which foot-candle reading may be directly taken. The scale illumination is by means of a small lamp contained in the meter, and accurate readings are taken by comparison of illumination through punched holes in the scale Even in the case of low intensities of 0-4½ foot-candles, these can be just as easily read on the scale as intensities of 60 or 80 foot-candles

(Continued on next page)

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ILLUMINATION ENGINEERING DATA (*Continued*)

Distribution Curves

Under the heading "Luminous Intensity" we show that, in the case of an ordinary incandescent lamp, the amount of light emitted is not the same in all directions (see Fig 4) In this case the "distribution curve" of an incandescent lamp is shown. Generally, however we indicate this curve by the right-hand half only, and without the arrows shown in our drawing (Fig. 4). In Fig. 6, we read in direction "a" a luminous intensity of 175 candles. If an incandescent lamp is hung in a fixture or an ornament, or is mounted in a frame or a bowl, then generally speaking, the radiation from the fixture, etc., will no longer be the same as the radiation from an incandescent lamp. The distribution curve of the fixture, etc., is now indicated as follows

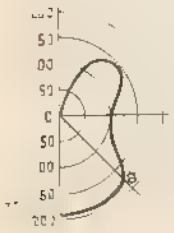

Fig 6.

The dotted line is the distribution curve of the lamp; the continuous line is the distribution curve of the fixture (Fig. 7).

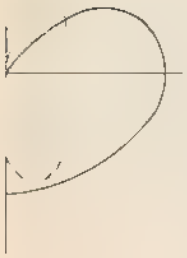

Fig. 7

According as the radiation from the lamp is modified in some way or other by the lighting fixture, we get entirely different modes of radiation, which are shown by means of curves This question can now be dealt with under the heading of Methods of Lighting, wherein we may observe different curves resulting from the use of various luminaires or reflectors and their selection for the four main lighting methods

Methods of Lighting

1. Direct Lighting.

In the case of direct lighting the light from the incandescent lamp is either for the greater part or entirely directed downwards

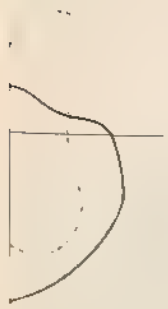

Fig 8a.

(a) It is directed downwards for the greater part when a small portion of the light proceeds upward (see Fig. 8a). This is the case with the so called "direct interior fittings," "Phililux" G. A. D. (top of globe opalized, bottom satined). Here the light falls direct on the objects in use on the working plant, causing a fair amount of shadow. By the portion that goes upwards the shade or the ceiling is slightly illuminated. The same thing happens in the case of the exterior fittings with the opal reflectors (Philulex NA).

(b) All the light is directed downwards (see Fig. 8b). This is the case with all fixtures with enamelled reflectors

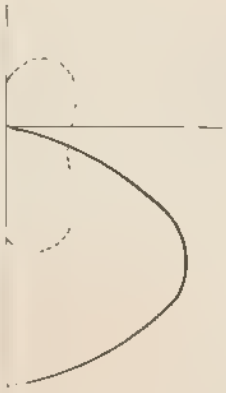

Fig 8b.

workshop fixtures, N R. lamps with bowl reflectors, etc. (See Philuma and Philulex series.) Here the shadow effect is even stronger than with the method "a"

Applications

For "a": Dustless factory spaces, lofty halls, churches, staircases

"b": Factories, street lighting, railway yards, platforms

2. Indirect Lighting.

The light is sent exclusively upwards. In this case, there must be a reflective surface above the fixture or above the frame (generally the ceiling or roof), owing to the nature of which the light is directed downwards entirely diffused (see Fig. 9). By this means the light received below is of a purely diffused character, and the illumination becomes almost shadowless. This result is obtained by means of the interior fixtures "Phililux G A.I.," or by lamps in cove frames

Fig 9.

Applications—

Draughting rooms, operating theatres, picture galleries, residential

3. Semi-Indirect Lighting.

This keeps the mean between 1 and 2. The greater part of the light is directed upwards; part of it goes straight downwards (see Fig. 10). This is achieved by means of Phililux G A.H. Unit.

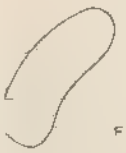

Fig 10

The principal flux of light going upwards, the result is the same as in the case of indirect lighting—that is to say, almost shadowless. The small portion of light that goes downwards causes just a little shadow effect, which, in most cases, is necessary

Applications—

Offices, schools, large stores, some factory workshops

Fig. 11.

4. General Diffused Lighting.

Here the light is diffused by the fixture as much as possible, and for a great part directed downwards, while a considerable portion also spreads upwards and to the sides. This is the correct type of lighting when the principal effect is required immediately under the lamp and the surrounding spaces have also to be sufficiently well illuminated.

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ILLUMINATION ENGINEERING DATA (*Continued*)

Residential Lighting.

Obviously, so extensive a subject cannot be fully dealt with in a catalogue such as this, but we may at least review some of the errors to be avoided and the advantages to be followed.

The main features in home lighting are:—First, the provision of sufficient illumination to permit working in comfort in every room. Secondly, the inclusion of an adequate number of lighting points placed in convenient and accessible positions, so that, by means of "flexibles," light may be added as a furnishing or part of a decorative scheme or used for any local purpose. Three or four points, in addition to permanent light sources, are by no means too many

Glare.

Glare is the effect created by the exposure of the eye to a bright light source. This can be easily avoided by using correctly designed fittings or obscured lamps

Shadow.

Clear lamps, used without proper shades and fittings, cause harsh shadows, making work difficult and spoiling artistic effects

Location.

The location of fittings should be carefully studied, since wrong location limits lighting value, and may produce annoying shadows

Quantity of Light.

Insufficient light is known to cause eyestrain, besides giving a dull and gloomy appearance in the room. Refer suggestions given for various rooms.

Quality of Light.

Obviously, a kitchen needs an entirely different quality of light from that of a drawing room. In the former, a bright light on the working plane is required, and, in the latter, soft mellow light is more appropriate.

Flexibility.

The flexibility of a lighting system adds greatly to comfort, convenience and utility. The installation of wall plugs in every room permits the use of wired furniture, table and floor standard, so that light may be used where required, thus making light the servant, and not the master. Wall plugs, also, facilitate the use of domestic apparatus, such as toasters, kettles, vacuum cleaners, etc

Lamps and Fittings

Types of Lamps

Electric lamps are divisible into three main classes, viz , carbon, vacuum, and gas-filled.

The carbon lamp is not suited for domestic illumination, as it consumes a large amount of energy, and gives only a poor light in return

The vacuum lamp is more efficient than the carbon lamp, and is available in sizes from 15 to 60 watts. The vacuum lamp should not be employed for lighting the important rooms in a house, as the more recent gas-filled lamps are more efficient for this purpose The chief application of the vacuum lamp is only where the number of burning hours is small and the lower cost of a lamp is a more important consideration than the small amount of current consumed.

The gas-filled lamp is the latest and most efficient type of lamp yet developed. Its filament, which is spiralized, is operated in a bulb with inert gas, and consequently a higher degree of incandescence is reached, with the result that more light is obtained from the lamp. The gas-filled lamp, by reason of its spiralized filament, is liable to be a source of glare, and so a number of improvements have been introduced into the manufacture of this lamp to obviate this defection. These consist principally of obscuring in some manner the clear glass of the bulb so that diffusion takes place

The newest and most satisfactory type of obscured gas-filled lamp is the Philips Argenta. This lamp has a bulb consisting of two thin skins of glass, the inner of clear glass and the outer of opal glass. The effect of this process is to diffuse the light over the whole surface of the bulb, resulting in a great reduction of glare and the elimination of harsh shadows

The Inside Frosted, or Arlita Pearl Lamp, represents the latest development in lamp manufacture, diffusion being obtained by frosting the inside surface of the bulb. This not only ensures diffusion with a small light absorption of two per cent., but leaves the natural polish on the outside of the bulb, thus reducing the accumulation of dirt and facilitating cleaning. These lamps can be safely used to replace clear lamps in every instance Note.—Inside frosted lamps are not supplied over 100 watts

Clear gas-filled lamps are used for general purposes, also in inverted bowls of the semi-direct type, or, in the latest types of totally enclosed three ply glass luminaires.

The high intrinsic brilliance of the filament makes it always advisable to use clear gas-filled lamps in luminaires or fittings which serve to screen the eyes from the glare of the filament, and which also serve to diffuse the rays emitted from the lamps.

The Daylight Blue Lamps may be used, in some cases, where a cool effect is desired. This lamp has a selectively tinted blue glass bulb, which filters out the excess red rays, so that the light emitted approximates that of natural daylight; thus a lamp of this type is to be recommended for sewing rooms, sun porches, etc.

Size of Lamps.

Since helpful advice cannot be complete without some indication of the types and sizes of lamps suitable for various fittings, the following suggestions as to general types of lighting equipment, together with the lamps necessary for their proper use, should prove of value. Although it is impossible to give intensity tables for lighting the home, some general recommendations can be made.

Halls.

A lamp wattage equivalent to not less than one-half the floor area in square feet is recommended.

Types. Where the lamp is obscured, either clear gas-filled or Arlita Pearl; where the lamp is visible, the Argenta.

For some hallways the use of the Duo-Savelite is to be recommended. This type of lamp, which has a double filament, may be switched down by means of a contrivance in the cap, thus reducing the normal burning of 25 watts to a dim light of 4 watts. It should be noted that, on the 4-watt filament, this lamp takes 250 hours burning to consume one unit of current.

Types of Diffusers.—Any of the Phili-Lite range may be recommended for this purpose, but perhaps the D.A. or D C. types are the most suitable in design. These units may be supplied either with Florentine bronze suspension chain, or with oxidised brass canopy for direct attachment to the ceiling.

Dining Room.

For general lighting, the lamp wattage should not be less than the area of the room in square feet. For three-light dining table

(*Continued on next page*)

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ILLUMINATION ENGINEERING DATA (*Continued*)

pendants, use 40-watt Arlita Lamps. Where inverted bowls are used, clear gas-filled lamps of not less than 100 watts are most suitable. For enclosed luminaires, Arlita Pearl, Clear Gas-filled or Daylight Blue Lamps are to be recommended

Diffusers—Phili-Lite diffusers, type according to choice

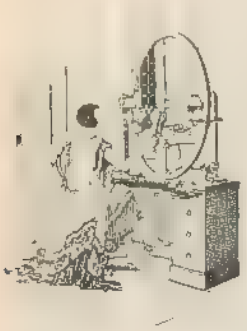
Drawing Room.

For general lighting a total lamp wattage equivalent to from half to three-quarters of the floor area in square feet for rooms of medium colourings.

For dark walls, one watt per square foot should be provided Floor standards and table standards should be equipped with Argenta, Arlita or Natural Colour Gas-filled Lamps

Where wall brackets are used, Natural Colour Argenta or Arlita Lamps of 40 or 60 watts, according to the size of the room, under silk or parchment conical shades

Diffusers. Any of the Phili-Lite range are suitable, but we would specially recommend the D.A. or D.E types for this purpose. In the case of extremely large rooms, the D G. type may be shown to advantage.



Bedrooms.

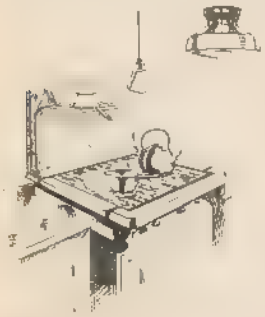
Bed brackets, table standards and dressing-table brackets should be fitted with Argenta or Arlita Lamps of 40 or 60 watts If a central fitting for general lighting is provided, a 100 watt gas-filled lamp will suffice.

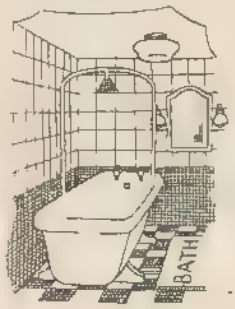
Diffusers—According to selection.

Kitchen.

For central lighting in the kitchen use a lamp wattage equivalent to approximately three-quarters of the floor area in square feet For example· In a kitchen 10ft x 13ft., the floor area is 130 square feet. The recommendation for this room is a lamp wattage equivalent to three-quarters of the floor area and the nearest standard size in 100 watts For lighting the cooking range, the Philips White Enamelled K R.D. Reflector should be used to house either a 40-watt Arlita Pearl or Daylight Blue Lamp. A similar fitting, using either of the types of lamps mentioned, should also be installed over the mixing slab or draining board.

Diffusers.—Phili Lite type specially recommended is the D.E. or D.B. type, with oxidised brass canopy attached direct to the ceiling. Another good lighting unit for the kitchen is the P.A. 16 type ceiling flange of white porcelain, used in conjunction with a 75 or 100-watt Argenta Lamp





Bathroom.

Use a lamp wattage equivalent to approximately one-half of the floor area in square feet. Forty-watt minimum for central lighting lamp should be used in conjunction with the P.A. 16 type ceiling flange, using an Argenta Lamp.

Where an enclosed glass luminaire is used, the Phili-Lite D E. type should be recommended, in conjunction wth a 75-watt Arlita Lamp.

Please note that wattage of lamp should be governed by the floor area. Further, it is not desirable to use a lamp of less than 75 watts with an enclosed luminaire

Over the shaving cabinet a 40-watt Arlita Pearl or Daylight Blue Lamp should be used, in conjunction with a K.R B Reflector.

Influence of Interior Finish on Illumination.

Lamps are frequently blamed for disappointing lighting effects, whereas the result is often due to the dark surroundings of the room. A larger lamp should be used in rooms with dark decoration than is necessary where light or medium colourings are employed.

When painting or papering the various rooms in the home, some knowledge of the reflecting powers of different coloured walls is useful As much as 80 per cent of the light falling on the dark walls and ceilings may be absorbed

Hall Fittings.

Fittings for the porch, the ceiling unit and hall. Arlita Pearl Lamps. For enclosed fittings, Argenta or coloured lamps in units with clear glass sides.

Standard Lamps.

Use a 40 to 60-watt Argenta or Natural Coloured Gas filled Lamp in table standards, lighted ornaments, wall brackets, bed brackets and wardrobe

Candle Fittings.

For candle fittings use 25 watts plain or twisted flame candle lamps. For large fittings, plain Argenta type lamps can sometimes be adopted

Electrolier.

Where an electrolier is used in the drawing room, recommend 40 to 60-watt Arlita or Argenta Lamps.

Inverted Bowls.

Remembering that the inverted bowl is used rather more as a reflector than as a diffuser, it is always desirable to use clear gas-filled lamps of higher wattage than would be necessary in an enclosed luminaire

Entrance Porch.

A porch light should be used, and, if possible, designed to fit flush to the ceiling. The Phili Lite D.H. type spherical luminaire is ideal for this purpose, and should be used in conjunction with a 60-watt Argenta Lamp. As an alternative, an antique lantern is frequently used For this purpose, recommend the Philips Natural Coloured Amber Lamp of 60 watts.

Verandahs

For permanent verandah lighting, recommend the Phili-Lite D E. type, with a 60-watt Arlita or Daylight Blue Lamp. Alternatively, recommend the P.A. 16 ceiling flange, used in conjunction with 60-watt Argenta Lamps.

The P.A. 16 ceiling flange permits the substitution of Philips Natural Coloured Gas-filled Lamps for verandah decoration at festive occasions.

A FEW NOTES ON SPECIAL TYPES OF LAMPS.

Clear Gas-filled. The Philips Clear Gas-filled is much to be preferred over the old vacuum types, and can be safely recommended in all places where the lamp is totally obscured.

Arlita Pearl. The Arlita Pearl is the Philips inside frosted lamp, and can be used in all places where total obscurity of the lamp or filament is not obtained. This lamp is particularly recommended for use inside an enclosed luminaire, as, because of the inside frosting, the filament of the lamp is not visible through the glass of the luminaire

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ILLUMINATION ENGINEERING DATA (*Continued*)

Arlita Pearl Lamps of low wattage are also entirely satisfactory for use in lamp standards, wall brackets, electroliers, etc.

The Argenta is a two-ply glass lamp, that is to say, an ordinary clear glass gas-filled lamp, having a thin skin of opal superimposed upon it. The Argenta represents the ideal in sheer lamp diffusion, and may be recommended for use in all places where it is not possible or desirable to obscure the lamp.

The Daylight Blue may be recommended particularly for all places where it is desirable to get a light emission closely approximating daylight. Thus, for use over the ironing board, over the cooking range, and in the sewing room, the Daylight Blue type provides a very happy addition to comfort in the home. Because of the sense of coolness experienced where this type of lamp is used, the Daylight Blue should be recommended for all positions where heat or stuffiness obtain.

Duo-Savelite.—This lamp is, perhaps, one of the most unique contributions to the householder. Normally, it provides a 25-watt light, its bulb of Argenta glass giving a very pleasing diffused light By means of a switching arrangement in the cap, the lamp may be quickly changed over to four watts. One of the difficulties in the use of electric light in the past has been the impossibility of turning it down. The introduction of this lamp provides a happy solution to that difficulty in the sick-room, the nursery, the porch, hall, stairway, in fact, in all places where it is desirable to leave a dim light burning for any length of time

The Crucia Lamp. In those homes where an altar or a shrine is installed for devotional purposes, the Crucia Lamp provides a very chaste religious symbol. By means of a Neon plate an outline of a cross gleaming blue and red is enclosed within the glass bulb of the lamp. This lamp will find a ready reception, not only in private homes, but in chapels and hospitals, and other religious institutions

Natural Coloured Lamps.—The addition of these lamps for interior home decoration has found a ready response among the more artistic home-makers. For use under coloured shades to match furnishings or colour schemes these lamps may be provided in red, blue, green or amber

Philips Candle Lamps. These lamps, used in bracket fittings or chandeliers, lend a wealth of charm and beauty to the home.

The Candelabrum Lamp is a complete candlestick, which may be used with an unique Philips fitting, and is available in blue, green or red shades

Flame Coloured Twisted Candle Lamps.

This new type of candle lamp lends itself for general home decoration in some chandeliers, wall brackets, or in any place where it is not desired to use a shade over the lamp.

Illumination Sets for Home Decoration.

This lighting outfit consists of a string of sixteen olive shaped coloured lamps, and is sold complete with holders, two spare lamps and special safety plug. The lamps, which are wired in series, are thoroughly weatherproof, and are specially suitable for decoration in the home, at birthday parties, balls, and other festive occasions.

Lamps of this type are particularly suited for Christmas tree decoration, and, indeed, on all occasions where colour and light may be used for decorative effect.

Commercial Lighting

Department Store Interior.

The type of fitting selected will depend on the method of lighting decided on. (Refer Methods of Lighting.)

Except in cases where purely decorative effect is required, the totally enclosed lighting unit is to be preferred. New Philips equipment makes it possible to use enclosed units, whatever method is selected. Under the heading of "Equipment" we illustrate a series of modern designs, which are applicable to various locations, making provision for artistic effect, while retaining as a basic principle maximum effective illumination, combined with economic service

The totally enclosed units offered are of three-ply glass, having an absorption factor as low as eight per cent., and because of the restraint and simplicity in design, are ideally suited for interior store lighting

Service to Architects.

Every individual lighting specification presents its own problem, and it is impossible to set down here any set principles without going very fully into the question of calculations, some of which are very involved. Realising these difficulties, and the time required for their solution, the Philips Lighting Service Bureau offers the services of their own Illumination Engineers, who will assist in the compilation of specifications, giving technically correct information concerning the spacing, mounting heights, etc., of various units at any particular location, in order to obtain a predetermined foot-candle illumination.

LIGHT AND COLOUR EFFECTS

Natural Colour of Object	COLOUR OF LIGHT FALLING ON THE OBJECT: Red	Orange	Yellow	Green	Blue	Violet
	RESULTANT COLOUR APPEARANCE					
Black	Reddish Black	Orange Black	Yellow Black	Greenish-Black	Blue Black	Violet Black
White	Red	Orange	Yellow	Green	Blue	Violet
Red	Red	Scarlet	Orange	Brown	Purple	Reddish Purple
Orange	Orange-Red	Orange	Yellow-Orange	Greenish-Yelow	Violet Brown	Red
Yellow	Orange	Yellow Orange	Yellow	Yellowish-Green	Green	Reddish-Brown
Light Green	Reddish Grey	Yellow-Green	Greenish-Yellow	Green	Blue-Green	Light-Purple
Deep Green	Reddish-Grey	Rusty Green	Yellowish Green	Green	Greenish-Blue	Greenish-Purple
Light Blue	Violet	Slate Grey	Yellowish-Grey	Greenish-Blue	Blue	Violet-Blue
Deep Blue	Purple	Bluish-Grey	Slate	Blue Green	Blue	Blue-Violet
Violet	Purple	Red-Purple	Violet-Grey	Blue	Violet-Blue	Violet

The above table indicates the appearances of coloured objects when subjected to different coloured lights

(*Continued on next page*)

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ILLUMINATION ENGINEERING DATA (*Continued*)

This is a very special service, of which Philips are justly proud, and architects and engineers are urged to avail themselves of it to the fullest extent.

The Shop Window.

The remarks given under "Service to Architects" also apply to shop window lighting We can, however discuss this question and give a broad outline of the requirements and a general table for average window lighting.

It is not generally realized that a window can be superbly lighted for quite a small outlay; on the other hand, the use of inferior reflectors, wrongly placed, can result in loss in efficiency glare and high current consumption.

The primary object is to light the display and so to control the light with reflectors that none is wasted or permitted to strike the eye of the onlooker.

The high intrinsic brightness of the gas-filled lamp necessitates its being shielded from the direct line of vision, for, otherwise, the glare experienced by the onlookers neutralizes its power to reveal the details of the display. It is essentially for this reason that the modern method of lighting windows from concealed sources has been developed. The old system, employing pendants, often with bare lamps, is extremely wasteful, only one-third of the light illuminates the goods, the remaining two-thirds being sent out of the window to afflict the eyes of the observer with glare

Under the heading "Equipment" we give constructional details of the four different types of window reflectors which comprise the Philiray series. This series covers all practical purposes in window lighting, each unit being designed to give a special light radiation (see illustration).

Type S.A. radiates the bulk of the light vertically downwards (shop windows of small depth).

Type S.B. radiates the light more obliquely downwards (shop windows of greater depth).

Type S.C. gives a highly concentrated beam (concentrated local lighting).

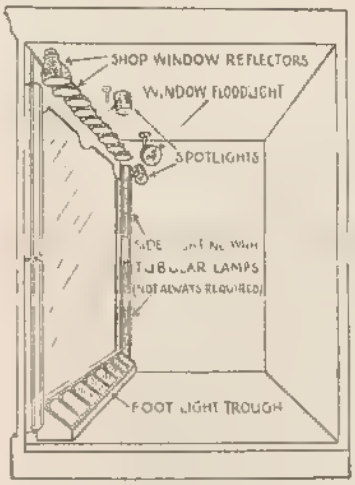
Type S.D. is a particularly small type, for use in all cases where little space is available

For colour installations a special screen is made to fit over the reflector

Footlights and Sidelights.

In general, windows can be adequately lighted from above, but occasionally the addition of footlights and sidelights makes an important contribution to the effect obtained These are of particular value in reducing shadows where models are displayed, especially in the case of shallow windows. This method is shown under "Installation"

Illustration shows a method, particularly valuable when the window has a return, as it provides a ready means of concealing the reflectors from view

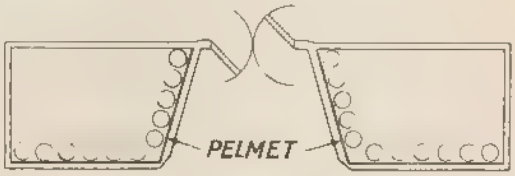


Installation.

The diagram given here shows a suitable arrangement of shop window lighting equipment The reflectors are installed at the top of the window, and are concealed from the street by a pelmet; the footlights and sidelights shown are only required when models are exhibited.

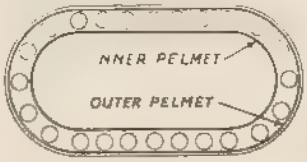
In the event of a second row of reflectors being used for a very deep window, a second pelmet should be placed in front of the additional reflectors.

The following is a typical window layout for lighting island sites



Island Sites

The lighting of island sites presents special difficulties, since the rear part of the reflectors is conspicuous, and unless precautions are taken, the onlooker experiences glare. These objections can, in a large measure, be overcome by the introduction of a second pelmet behind the reflectors, and of such a depth that the filaments of the lamps are concealed from all sides of the island window.



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ILLUMINATION ENGINEERING DATA (*Continued*)

This table indicates modern practice for first-class lighting The required wattage can be approximately estimated from the table:—

Height of window in feet.	Depth of window in feet.	I. For a lighting intensity of approx. 80 foot-candles.	II. On special occasions (lighting intensity approx. 150 foot-candles) switch on extra lights, as indicated below.
3	1½	3 SA 150-40 watts	2 SA 150-60 watts
	3	2 SA 150-60 watts 1 SB 225-100 watts	2 SB 225-100 watts
	5	3 SB 225-100 watts	2 SB 225-150 watts
5	1½	3 SA 150-60 watts	2 SA 175-75 watts
	3	3 SA 175-75 watts	2 SA 175-75 watts
	5	2 SA 175-75 watts 1 SB 225-150 watts	2 SB 225 150 watts
	6½	3 SB 225-150 watts	2 SB 245-200 watts
6½	8	3 SA 220 100 watts	2 SA 220-100 watts
	5	3 SA 220-150 watts	2 SA 220 150 watts
	6½	2 SA 230-150 watts 1 SB 225-150 watts	2 SB 225-150 watts
	8	3 SB 225-150 watts	2 SA 220-150 watts
8	3	3 SA 220-100 watts	2 SA 220-150 watts
	5	3 SA 220 150 watts	2 SA 220-150 watts
	6½	2 SA 225-150 watts 1 SB 226-150 watts	2 SB 225-160 watts
	8	2 SA 220 150 watts 1 SB 245-200 watts	2 SB 225-150 watts
	10	3 SB 245-200 watts	2 SA 245-200 watts
10	5	3 SA 220-150 watts	2 SA 220-150 watts
	6½	3 SA 220-150 watts	2 SA 245-200 watts
	8	3 SA 245-200 watts	2 SB 245-200 watts
	10	2 SA 245 200 watts 1 SB 245 200 watts	2 SB 245-200 watts
	11½	3 SB 245-200 watts	2 SA 245-200 watts

Industrial Lighting

(See also Flood Lighting).

Factory Lighting.

Lighting installations in factories can be, roughly, divided into three classes:—

1. General Overhead Lighting.
2. Localized Lighting.
3. Combination of Overhead and Local Lighting.

General Overhead Lighting.

The general overhead system of lighting is usually designed so that units are a minimum of 10 feet from the floor, and are so spaced that the illumination is substantially uniform. Work can then be carried out with equal facility in any part of the workshop; moreover, an alteration in the workshop layout does not require a corresponding alteration of the lighting system.

The overhead units used are listed under "Equipment," and comprise the Phililux and Philuma series of reflectors.

Localized Lighting.

This system is similar in principal to General Lighting, except, of course, being mounted with respect to the work done, there cannot be the same measure of uniformity Such a method has little to recommend it, as the resultant evils more than outweigh its advantages.

NA ND. NK KRA

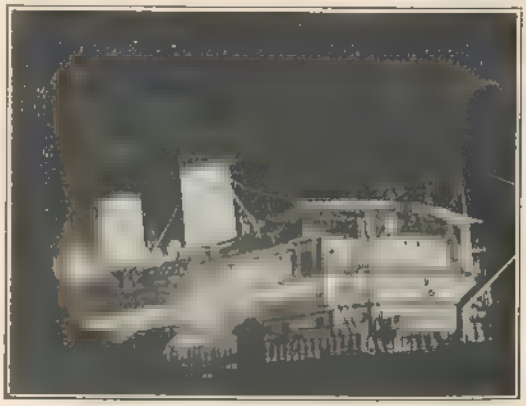
Combination of Overhead and Local Lighting.

This form of application is used in two ways Firstly, in those shops where directional illumination is necessary to obtain a proper view of the work, and, secondly, where very high intensities are required for fine operations In both those cases, the best results are obtainable when a general system of lighting is installed and supplemented by local lighting obtained from properly designed equipment. It is essential that the greatest care be taken to ensure that the variation in intensity provided throughout the rooms by the two systems is insufficient to produce a subtle form of glare by virtue of too great a contrast in brightness Architects and

engineers are reminded that special papers dealing with this subject are available on application to the Philips Lighting Service Bureau, Box No 2703C, G P.O., Sydney.

Bill Board Lighting.

Like floodlighting, the question of effective and economical Bill Board Lighting requires a nice calculation, which is purely the province of the illumination engineer Probably there is no form of outdoor lighting in which so much error is evident, and so much unnecessary loss



in consequence Architects and engineers are again reminded that the Philips Illumination Engineer will be pleased to act in the capacity of consultant for all lighting problems, and all members of the profession are invited to avail themselves of this service

Further reference to outdoor lighting is made under the heading of Floodlighting

(Continued on next page)

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ILLUMINATION ENGINEERING DATA (*Continued*)

Floodlighting

Decorative and Industrial.

Floodlighting has been rightly described as the "Glory of the Illumination Engineer," for in this departure from usual practice, some of the most spectacular and fascinating effects are obtained. Floodlighting is extensively used on the Continent and in America, but is still in its infancy as far as Australia is concerned. Recently there have been a few outstanding installations, particularly the lighting of the Royal Netherlands Squadron on the occasion of their visit to Sydney, and the subsequent lighting of the already famous Sydney Harbour Bridge, etc. Without entering too much into intricate technicality, we list here a series of units specially priced to popularize this method of lighting, some photographs, and a list of suggested applications

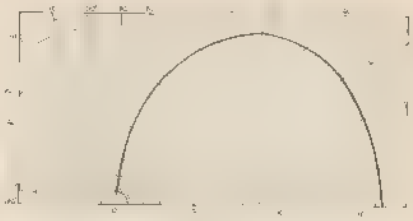
The 'Philiflood' series of reflectors have been specially designed for the floodlighting of facades, towers, etc. They are, however, also successfully employed for other purposes, such as the lighting of aerodromes, sports grounds, and other open spaces; for local lighting at loading and discharging berths; for the lighting of large boardings, for semi-indirect lighting of sheds, etc. The "Philiflood" units are supplied in two fundamentally different types, viz.: Broad beam units (angle of radiation about 120 deg.), white enamelled, types FLA, FLB, FLF; and narrow beam units (angle of radiation about 30 deg.), with parabolic mirror, types FLC, FLD, and FLG.

Wide-Beam Reflectors

"Philiflood" FLA with white-enamelled reflector is suitable for normal lamps of 750 to 1,500 watts inclusive It may also be used with projector lamps (burning in vertical position, without mirror) instead of with normal lamps, the lighting effect then being 10 per cent. greater. In view of the fact that this reflector gives a broad radiation of light (in an angle of about 120 deg.), it should be placed fairly close to the facades of the building Type FLA serves for illuminating facades of large area The reflector is fitted with a binding-clip, by means of which it can be mounted on a rod or tube and conveniently turned into any desired position.

Types FLA and FLF.

PHILIFLOOD FLA and FLF.

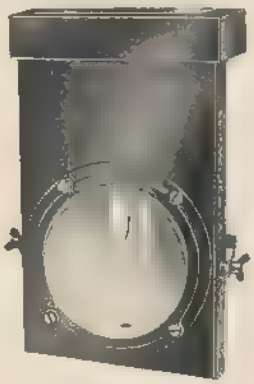


1000 Lumens.

"Philiflood" FLA and FLF.

Type	Diameter in inches.	Height in inches.	Normal Gasfilled Lamps	Projection Lamps, Vertical
FLA	18	23½	750, 1000 1500 watt	750, 1000 1500 watt
FLF	12	16	200-300	–

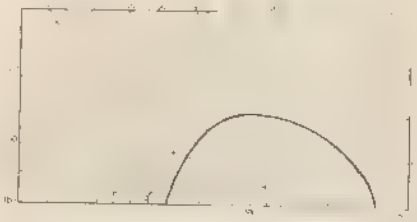
"Philiflood" FLB, with white-enamelled reflector, is a special type for floodlight lamps of 1000 watts (burning in suspensory position). It was therefore possible to give this reflector a highly compact, rectangular form.



Type FLB

The normal facade-lighting reflectors FLA, when mounted in front of imposing edifices, are liable to mar the appearance of the locality during the daytime This is never so with the "Philiflood" FLB, the size and shape of which are by no means conspicuous. This reflector may even be mounted on a lamp-post or span-pole. Moreover, it is possible to fit this reflector with a side screen, which sharply limits the sideway radiation. This is a very important consideration when the reflector is mounted at a corner. It should always stand in a practically vertical position (maximum inclination from vertical 15 deg.). The radiation can be directed higher or lower by adjusting the height of the lamp at a higher or lower position

PHILIFLOOD FLB.



1000 Lumens.

"Philiflood" FLB.

Type	Width in inches.	Height in inches.	Special Floodlight Lamps, Vertical
FLB	10	16	1000 watt

"Philiflood" FLF is a smaller type of the FLA. It is provided either with Edison (or bayonet) holder, or with Goliath holder, and is suitable for lamps of 200 and 300

(*Continued on next page*)

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ILLUMINATION ENGINEERING DATA (*Continued*)

watts. In order that the filament of the lamp may in both cases be adjusted at the correct light-centre height in the reflector, the metal plate bearing the holders is so constructed that it can be reversed (back turned frontwards). When the Goliath holder is at the front, it is in any case adjusted at a lower position than the Edison or bayonet holder when the latter are turned frontwards.

Narrow-Beam Reflectors

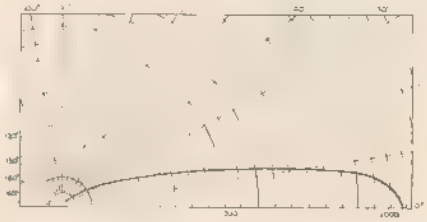
"Philiflood" FLC, with silvered mirror, in two types—
(1) With facetted mirror (FLC 1)
(2) With smooth mirror (FLC 2)

"Philiflood" FLC 1, with facetted mirror, is suitable for normal gas-filled lamps of 300 and 500 watts, and for projector lamps of 1,000 watts. The reflector gives a fairly narrow beam with a very uniform light-distribution. It is, therefore, particularly well suited for illuminating facade surfaces, etc., from a considerable distance (e.g., 40-60 yards)

"Philiflood" FLC 2, with smooth mirror, is suitable for projector lamps of 1,000 watts and gives a narrow, highly-concentrated beam. This type is, therefore, the most suitable for illuminating the tops of towers, spires, gables of houses (reflector to be placed at a distance of 60-200 yards), factory chimneys (reflector to be placed close to base).

Type FLC.

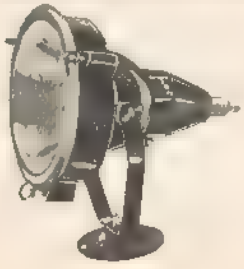
PHILIFLOOD FLC



1000 Lumens.

"Philiflood" FLC 1 and FLC 2.

Type	Diameter in inches.	Height in inches.	Normal Gasfilled Lamps	Floodlight Lamps
FLC 1	18	18 4/5	300 to 750w.	500 to 1000w
FLC 2	18	18 4/5		500 to 1000w



Type FLD.

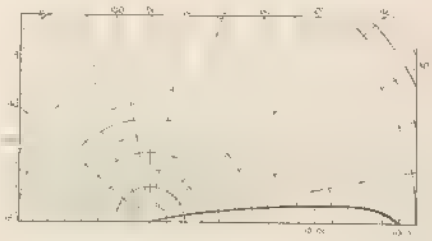
"Philiflood" FLD is a smaller type of the FLC. It is suitable for normal gas-filled lamps of 100 and 200 watts and for projector lamps of 250 watts. In its effect, this model corresponds to the FLC.

Besides for facade lighting, the FLD can also be used for the lighting of small theatre-stages, and especially for the lighting of tennis-courts.

The FLD, like the FLC, is made in two types:—

(1) Type FLD, with facetted mirror, i.e., with greater light-dispersion
(2) Type FLD 2, with smooth mirror, i.e., with projector beam

PHILIFLOOD FLD.



1000 Lumens

"Philiflood" FLD 1 and FLD 2.

Type	Diameter in inches.	Height in inches.	Normal Gasfilled Lamps	Floodlight Lamps
FLD 1	13 3/5	14 4/5	100 to 200w	250 watt
FLD 2	13 3/5	14 4/5		250 watt

"Philiflood" FLG, with cylindrical parabolic mirror, is intended for "Linea" lamps. In the longitudinal direction this reflector thus gives a broad radiation of light. On the other hand, in the lateral direction (the line-shaped filament then acting as a luminous point), an ideal, narrow beam is produced, the breadth of which can be controlled by adjusting the lamp.

Manner of Mounting Types FLA, FLB and FLF.

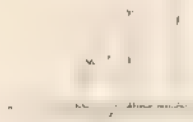


Fig. 1.

The reflector must, if possible, be placed directly in front of the facade. The distance "g" between reflector and facade should be equal to half the height of the facade. The most favourable effect is obtained when the light centre, height "h," is also equal to half the height of the facade (see Fig. 1). If, for any reason, the reflector has to be placed nearer to the facade, and at a smaller height ("g" and "h" then being less than half the height of the facade), as in Fig. 2, the reflector should, in the case of the FLA and FLF, be tilted backwards to such an extent that the radiation axis is directed towards the middle of the facade. In the case of the FLB, the lamp should be adjusted as low as possible.

Lamp-Wattage and Number of Reflectors.

Fig. 2.

The distance between the various reflectors should in no case exceed half the height of the facade; in other words, the measurement "b" in Fig. 3 should not be more than half "h."

The wattage required for sufficiently lighting up a facade in a dark environment is about 15 watts per square yard of facade surface.

In a bright environment, about 30 watts per square yard should be applied. This will also be the case when particularly imposing light effects are desired.

(Continued on next page)

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ILLUMINATION ENGINEERING DATA (*Continued*)

Fig. 3.

Example

Length of facade, 36 yards; height, 42 feet (i.e., 14 yards), dark environment. Area of facade, 36 x 14, equal to 504 square yards, required wattage, 504 x 15, equal to 7560 watts, half height of facade, 7 yards. Use five reflectors, each with a 1500 watt lamp, mounted at intervals of seven yards.

For Types FLC, FLD and FLG.

The reflectors FLC 1, FLG 1 (with facetted mirror) and FLG give a fairly broad beam, so that these types can be used for the floodlighting of facades for a considerable distance. In a dark environment, 15 watts per square yard should be applied; in a bright environment (or when a particularly strong illumination is required), 30 watts per square yard.

The reflectors, FLC 2, FLD 2 (with smooth mirror) and FLG, with the filament exactly at the focus, give a very narrow beam. According to the distance between reflector and object (60-200 yards), apply 15 to 45 watts per square yard.

For the FLD reflector we supply a special pedestal, on which the reflector can very easily be mounted without any special fixing devices

Colour Philiflooding.

For the production of coloured light we supply small tins of paint. This paint can be poured on to the glass guard and evenly distributed by shaking the glass.

We can supply four different colours: Red, green, yellow and blue. The paint can be washed off again by means of cleaning liquid which we supply together with the paint.

Night Sports.

Plans and specifications for the lighting of all outdoor sports, such as tennis, bowls, football, etc., are

available on application to Philips Lamps. All that is necessary is to give purpose and dimension of the area to be lighted.

General Lighting.

Public buildings.	Churches.
Schools.	Hospitals.

Under "Equipment" we illustrate a series of the Phililite Units available for general purpose, but, as in many cases special consideration is necessary, we again invite you to avail yourselves of the special advisory service of our Consultant This service offers the best available advice in all technical problems arising in lighting practice, and is designed for the practical help of the profession.

EQUIPMENT

INCANDESCENT ELECTRIC LAMPS

GAS-FILLED LAMPS

ARLITA PEARL INSIDE FROSTED

Volts.	Cap.	Watts.
20-260	B.C. or E.S	40
		60
		75
		100

CLEAR AND ARGENTA.

Volts.	Cap.	Watts.
		15
20-95		25
20-165		40
20-260	B.C. or E.S	60
		75
		100
		150
		200
20-260		300
25-260		500
35-260		750*
50-260	Gol	1000*
75-260		1500*
100-260		2000*
100-260		3000*

*Not supplied with Argenta Glass

DAYLIGHT BLUE GLASS

Volts.	Cap	Watts.
		40
20-260	B.C or E.S	60
		75
		100
		150
20-260		200
25-260		300
35-260	Gol	500
50-260		750
75-260		1000
		1500

VACUUM LAMPS

ARLITA PEARL INSIDE FROSTED

Volts	Cap.	Watts.
		15
20-260	B.C or E.S.	25
		40

SPIRAL, CLEAR, DROPSHAPE

Volts.	Cap	Watts.
		15
20-260	B.C or E.S.	25
		40

STANDARD TYPE, CLEAR, PEARSHAPE.

Volts	Cap.	Watts
		15
20-260	B.C or E.S	25
		40
		60

REINFORCED CONSTRUCTION, CLEAR PEARSHAPE (WITH ADDITIONAL FILAMENT SUPPORTS)

Volts.	Cap	Watts.
		25
20-260	B.C. or E.S.	40
		60

SIGN LAMPS, PEARSHAPE

Daylight, Natural Colour, Colour Sprayed

Volts.	Cap.	Watts.
11	E.S	5
60		5
120		10
200-260		15

(Continued on next page)

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EQUIPMENT (*Continued*)

ILLUMINATION LAMPS DROPSHAPE

Clear Sprayed Natural Coloured

Volts	Cap	Watts
20–260	B.C. or E.S.	15

CARBON FILAMENT LAMPS, PEARSHAPE

Volts	Cap.	Candle-Power.
20–260	B.C. or E.S	8 16 25 32 50

With voltage ranges mentioned in this catalogue between 20V.-260V., the following voltages are meant:—

1. Between 20 and 74V., every one volt.
2. Between 75 and 260V., in five-volt steps

VACUUM SPRAYED COLOUR AND NATURAL COLOURED, PEAR-SHAPE, OR ESPIRAL DROP-SHAPE.

Volts.	Cap.	Watts.
20–260	B.C. or E.S.	15 25 40 60

GAS-FILLED SPRAYED COLOUR AND NATURAL COLOURED GLASS.

Volts.	Cap.	Watts.
20–260	B.C. or E.S	40 60 75 100 150 200
	Gol.	300

STOCK COLOURS:

Natural Coloured: Red, Blue, Green, Yellow (Amber).

Sprayed. Red, Blue, Green, Orange, Yellow.

CANDLE LAMPS (VACUUM).

For Chandeliers, Wall Brackets, Candle Fittings, etc.

Clear, Frosted, Colour Sprayed

Volts	Cap	Description	Watts
20–260	B.C. or	Plain flame	15
20–260	S.B.C.	Plain flame	25
20–260	E.S. or S.E.S.	Twisted flame	25
		Theatre pattern	
20–260		Twisted	25
20–260		Do. do	40

CANDELABRUM LAMPS (VACUUM).

Fitted with Candle Tube ready for use with Candle Fittings

Volts.	Cap.	Watts.
100–260	S.B.C. or S.E.S.	15 25

ROUND BULB CLEAR OR FROSTED LAMPS (VACUUM)

For use with American Candle Fittings.

Volts.	Cap	Watts
20–260	E.S. and S.B.C. or B.C.	15 25 40

SHOW WINDOW LAMPS (VACUUM)

Clear and Half Silvered

Volts.	Watts.	Diam.	Overall of tube	Diam. of Cap.
100–260	25	1⅛	10¼	⅝in
	40	1½		⅝in
	60	1½	12 1/16	⅝in
	100	1¾		⅝in.

There are special holders for these Show Window Lamps. Clear Window Lamps are to be used with Reflectors. Half-silvered Lamps do not require any additional Reflectors.

RADIATOR LAMPS (FLAME SPRAYED)

Volts.	Cap.	Watts.
100–260	B.C.	250

PILOT LAMPS (VACUUM)

For Indicating Purposes.

Description	Volts.	Cap.	Watts.
Clear	20–260	S.B.C., B.C. or E.S.	15
Red Sprayed or Varnished			15

See also Neon Pilot Indicator Lamps.

PROJECTION LAMPS, CLEAR SILVERED

Volts.	Watts.	Cap.	Horizontal	Vertical with Mirror.
100–160 and 200–260	100	E.S.	107	106
	250	E.S.	432	433
	500	Gol.	66	6[illegible]
	1000	Gol.	68	62
	1500	Gol.	69	63
	*2000	Gol.	309	310
	*3000	Gol	345	346

*Not supplied with Silvered Mirror

CINEMA LAMPS

Volts.	Watts	Cap	Type No
100–130 and 200–240	100	E.S.	348
	250	E.S.	383
	500	E.S.	3[illegible]5
	1000	Gol	297
30	100	E.S	410
	300	E.S.	376
	900	Gol.	75
	900	Gol.	379E
15	600	Gol	381
	750	Gol.	382
	750	Gol.	6001
	750	Gol	6004

Note.—Type No. 6004 is supplied with inside mirror at an extra of 1[illegible] per cent. on above list price.

Note.—Type Nos. 6001 and 6004 are both constructed to burn cap upwards.

TUBULAR LAMPS (VACUUM).

For use where space is limited, these are sometimes essential.

Clear, Frosted.

Volts.	Cap	Watts
20–260	Bayonet or screw	15 25

FLOODLIGHT LAMPS.

Volts.	Watts.	Cap.	Type No
100-160 and 200–260	100	E.S.	120
	250	E.S.	123
	500	Gol	125
	1000	Gol.	504
	1500	Gol.	—

DECORATIVE SETS.

(200-250 Volt Series Burning).

Sets comprise 16 miniature electric olive-shape coloured lamps (assorted Red, blue, green, orange and white), two spare lamps, and the necessary flexible electric wiring, with 16 lamp-holders for attachment anywhere.

Special Round Bulb Lamps can be supplied in place of olive-shaped lamps

FLASOLITE LAMPS

In Red, White, Blue, Orange, Yellow, Flame, Green in addition to Clear

Volts.	Cap.	Watts.
200–260	B.C. or E.S.	40 or 60

THE DUO-SAVELITE

With two lighting intensities 4 or 25 watts Opal glass.

PHOTOGRAPHIC LAMPS.

THE DUO-PHOTO LAMP

Available in two types Clear White and Yellow (for printing and developing) and Clear White and Red (for developing plates and films). 100-260 volts.

THE PHOTOMIRENTA

For the lighting of the most modern studios. Opal glass, with half inside mirror. 200-260 volts, 500 watts

THE ARGA PHOTO.

Designed for spot lighting in studios Should be used with a Philiray Flood Reflector, Type SC255. 200-260 volts, 500 watts.

DARKROOM LAMPS

Spiranized Metal Filament, Ruby Glass, Vacuum Type, 100-260 volts Pearshape B.C. or E.S. 25W 40W and 60W.

NEON INDICATOR LAMPS.

Dwarf Indicators.

Voltage.	Current.	Cap.
110-160 200-260 200–260	D.C or A.C.	Small B.C. Small E.S or Candelabra

Standard Indicators.

Voltage.	Current	Cap
110-160 200–260 200-260	D.C. or A.C.	B.C. or E.S

(Continued on next page)

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

EQUIPMENT (*Continued*)—LUMINAIRES, REFLECTORS, ETC.

PHILILITE LUMINAIRES

Type	For Gasfilled Lamps of.	Globe Diam. Inches.	Total Length. Inches.
DA 26	40, 60, 75, 100 watts	10¼	35⅛
DA 33	100, 150, 200 watts	13	38 3/16
DA 35	300, 500 watts	13¾	39¾
DB 26	40, 60, 75, 100 watts	10¼	31⅞
DB 33	100, 150, 200 watts	13	34 1/16
DC 26	40, 60, 75, 100 watts	10¼	33⅛
DC 33	100, 150, 200 watts	13	35 13/16
DC 35	300, 500 watts	13¾	38⅝
DD 26	40, 60, 75, 100 watts	10¼	32½
DD 33	100, 150, 200 watts	13	34⅝
DD 35	300, 500 watts	13¾	36⅝
DF 26	40, 60, 75, 100 watts	10¼	35 13/16
DF 33	100, 150, 200 watts	13	39
DF 35	300, 500 watts	13¾	40 9/16
DH 20	40, 60, 75, 100 watts	7⅞	33 11/16
DH 25	100, 150, 200 watts	9⅞	36 7/16
DH 33	300, 500 watts	13	40¾
DJ 25	40, 60, 75, 100 watts	9⅞	31⅛
DJ 30	100, 150, 200 watts	11 13/16	33½
DJ 35	300, 500 watts	13¾	35 [illegible]
DM 26	40, 60, 75, 100 watts	10¼	28¼
DM 33	100, 150, 200 watts	13	31⅛
DM 35	300, 500 watts	13¾	33½
DN 25	100, 150, 200 watts	9¾	31[illegible]
DN 35	300, 500 watts	13¾	34⅝
DE 30	40, 60, 75, 100 watts	11 [illegible]	8 [illegible]

Type	For "Argenta" Lamps of:	Diam. Inches.	Height Inches.
PA 16	40, 60, 75, 100 watts	6 5/16	3 [illegible]
500	40 and 60 watts	1¾	4½
510	75 and 100 watts	1¾	5½

PHILILUX LUMINAIRES

Type	For Gasfilled Lamps of:	Globe Diam. Inches.	Total Length. Inches.
GAI 26	40, 60, 75, 100 watts	10¼	35⅛
GAI 33	100, 150, 200 watts	13	38 3/16
GAI 35	300, 500 watts	13¾	39¾
GAD 26	40, 60, 75, 100 watts	10¼	35⅛
GAD 33	100, 150, 200 watts	13	38 3/16
GAD 35	300, 500 watts	13¾	39¾
GBD 26	40, 60 75 100 watts	10¼	32½
GBD 33	100, 150, 200 watts	13	34⅝
GBD 40	300, 500 watts	15¾	41
GAH 26	40, 60, 75, 100 watts	10¼	35⅛
GAH 33	100, 150, 200 watts	13	38 3/16
GAH 35	300, 500 watts	13¾	39¾
GJH 25	100 150 200 watts	9⅞	31⅛
GJH 35	300 500 watts	13¾	35 [illegible]

PHILIRAY REFLECTORS

Type	For Gasfilled lamps of	Holder	Diam in Inches
SA 150	40, 60 watts	HA 58	5[illegible]
SA 175	60, 75 watts	HA 58	6⅞
SA 220	100 150 watts	HB 78 HC 78	8⅝
SA 245	150, 200 watts	HB 78, HC 78	9⅝
SB 225	100, 150 watts	HB 78, HC 78	8⅞
SB 245	150, 200 watts	HB 78, HC 78	9⅝
SC 220	100, 150 watts	HB 78, HC 78	8⅝
SC 255	150, 200 watts	HB 78, HC 78	10 1/16

Type.	For Spiralized filament lamps of	Holder.	Diam in Inches
SD 80	15 25 watts	HD 30	3⅛

Phililite Type DA.

Phililite Type DB.

Phililite Type DE

Phililite Type DF.

PHILIRAY HOLDERS

Type.	For Reflectors.	Total Height with Reflector in Inches.
HA 58	SA 150	7 11/16
	SA 175	8 3/16
HB 78	SA 220–SA 245	9 1/16–10¼
	SB 225 SB 245	11 7/16–12⅝
	SC 220 SC 255	9⅝–11
HC 78	SA 200–SA 245	11 [illegible] 13
	SB 225 SB 245	13¼ 15⅜
	SC 220 -SC 255	12 14 3/16
HD 30	SD 80	2 5/8 3 5/16

The holder HA 58 is not adjustable.

The holders HB 78 and HD 30 can be adjusted for different heights.

The holder HC 78 can be adjusted for different heights and turned in all directions.

PHILIRAY COLOUR SCREENS

Part.	For Reflectors.
Colour-screen Holder K 180	SA 150, SA 175
Set of Colour screens G 180 (Red, yellow, green, blue, violet)	
Colour-screen Holder K 260	SA 220, SA 245 SB 225, SB 245
Set of Colour-screens G 260 (Red, yellow, green, blue, violet)	SC 220, SC 255

PHILIFLOOD FLOODLIGHTS

Type.	Lamps.	Diam. in Inches	Height in Inches.
FLA	For normal gas-filled lamps of 500, 750, 1000, 1500 watts For projection lamps of 500, 1000, 1500 watts	17¾	22 3/16

Type.	Special Lamp for Burning in Suspensory Position	Breadth in Inches.	Height in Inches
FLB	1000 watts	11	15¾

Type	For Gasfilled lamps of	Diam in Inches.	Height in Inches.
FLF	200, 300 watts	11 15/16	15 9/16

Type	Mirror	Lamp Projector	Normal Gasfilled Lamp	Diam. in Inches	Length in Inches
FLC 1	Facetted	1,000 watts	300, 500 watts	17¾	20⅞
FLC 2	Smooth	000 watts		17¾	20⅞
FLD 1	Facetted	250 watts	100, 200 watts	12	16½
FLD 2	Smooth	250 watts	—	12	16½

Type.	For "Linea" Lamps of:	Breadth in Inches.	Height in Inches
FLG	300, 500, 1000 watts	8 1/16	14 3/16

(*Continued on next page*)

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

EQUIPMENT (*Continued*)—LUMINAIRES, REFLECTORS, ETC.

PHILUMA REFLECTORS

Type.	For Gasfilled Lamps of:	Diam. of Reflector in inches	Total Height in inches
NR 25	40 and 60 watts	9⅞	6⅛
NR 30	75 and 100 watts	11 13/16	7 1/16
NR 35	150 watts	13¾	8¼
NR 40	200 watts	15¾	9
NR 45	300 and 500 watts	17¾	12 1/16
NR 30D	75 and 100 watts	11 13/16	7⅞
NR 35D	150 watts	13¾	8 1/16
NR 40D	200 watts	15¾	9 13/16
NB 35	100, 150, 200 watts	13¾	12⅝
NB 45	300, 500, 750 watts	17¾	16¾
ND 30	100, 150, 200 watts	11 13/16	15⅝
ND 40	300, 500, 750, 1000 watts	15¾	19⅛
NG 25	100, 150, 200 watts	9⅞	11¼
NG 35	300, 500, 750, 1000 watts	13¾	16⅛
NG 45	1000, 1500, 2000 3000 watts	17¾	24 3/16

Type.	For "Argenta" Lamps of:	Diam. of Reflector in inches	Total Height in inches
NF 30	40, 60, 75, 100 watts	11 13/16	12¾

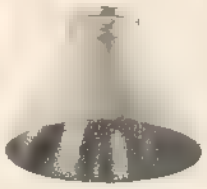
PHILUMA JR.

Type.	Designed With:	For Gasfilled Lamps of	Diam. of Reflector in inches
KRA I KRA II KRA III KRA IV KRA V KRA VI	Gas Bush ⅜in Ring Nipple ⅜in. Suspension Clip ⅜in. Porcelain Holder Porcelain Holder, with Switch 1⅛in. Aperture	40, 60 75 watts	6 11/16
KRB I KRB II KRB III KRB VI	Gas Bush ⅜in. Ring Nipple ⅜in. Suspension Clip ⅜in. 1⅛in Aperture	40, 60 75 watts	6
KRC I KRC II KRC III KRC VI	Gas Bush ⅜in. Ring Nipple ⅜in. Suspension Clip ⅜in. 1⅛in. Aperture	100, 150 200 watts,	9 7/16 12 3/16

Philite Type DC.

Philite Type DH 16.

Philite Type 500.



Philite Type SC.

PHILUMA JR. (*Continued*)

Type.	Designed With:	For Gasfilled Lamps of.	Diam. of Reflector in inches
KRD IV KRD V KRD VI	Porcelain Holder Porcelain Holder and Switch 1⅛in. Aperture	40, 60 75 watts	6¾

PHILULUX REFLECTORS

Type.	For Gasfilled Lamps of.	Diam. of Reflector in inches	Total Height in inches
ND 30	100, 150, 200 watts	11 13/16	15⅝
ND 40	300, 500, 750, 1000 watts	15¾	19⅛
NG 25	100, 150, 200 watts	9⅞	11¼
NG 35	300, 500, 750, 1000 watts	13¾	16⅛
NG 45	1000, 1500, 2000, 3000 watts	17¾	24 3/16
NB 35	100, 150, 200 watts	13¾	12 1/16
NB 45	300, 500, 750, 1000 watts	17¾	16¾
NA 30	100, 150, 200 watts	12	11 7/16
NA 35	300, 500, 750, 1000 watts	13¾	15 3/16
NA 45	750, 1000, 1500 watts	17¾	22 1/16
NE 50	200, 300, 2 x 500 watts 2 x 750 watts, or 1 x 500 and 1 x 300 watts, or 1 x 100* and 1 x 750 watts	19 11/16	21 1/16

* For this, a Goliath Edison or Goliath-Swan Reducer can be supplied.

NC 30	100, 150, 200 watts	11 13/16	14⅝
NC 40	300, 500, 750, 1000 watts	15¾	19⅛
NL 30	100, 150, 200 watts	11 13/16	13⅝
NL 40	300, 500, 750, 1000 watts	15¾	18⅞
NF 30	40, 60, 75, 100 watts (Argenta Lamps only)	11 13/16	13¾
NK 30	60, 75, 100, 150, 200 watts	11 13/16	11 3/16
NM	100, 150, 200 watts	—	10⅝
NU 30	300, 500, 750, 1000 watts	11 13/16	22⅝

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

S E C
LIGHTING

STATE ELECTRICITY COMMISSION
OF VICTORIA

HEAD OFFICE: 22 WILLIAM STREET, MELBOURNE

Metropolitan Electricity Supply Showrooms:
238 FLINDERS STREET, MELBOURNE

DISTRICT SHOWROOMS THROUGHOUT VICTORIA

31f

S.A.A. File No.

[For Other Products, See Index]

HOME LIGHTING

Fundamental Principles

Home lighting must be judged from two viewpoints —utility and decoration and the aim should be to achieve an adequate measure of each

Unfortunately, most homes are poorly lighted, i.e., they are inadequate as regards sufficiency, shading, control and distribution. The importance of the utilitarian viewpoint cannot be too strongly stressed, for the eyesight of people, especially children, must be carefully guarded. It is essential to attain brightness, but it is equally essential to avoid glare

From the decorative standpoint, good lighting is a material aid to the effective display of the furnishings. It may be said that a well-lighted room is half furnished, but a half-lighted room is poorly furnished.

Bracket Lantern.

Electrical Convenience

The convenient use of electricity for home lighting is limited most seriously by the inadequacy of the wiring. Lighting and power points should be of such numbers and in such positions as to permit of the artistic arrangement of portable lamps and also to make the normal night-time occupations of reading, sewing and card playing pleasurable.

Wall Bracket.

Because of the varied types of homes, no fixed rule can be set down as to the number of power points to be provided, but present good practice is to provide at least one duplex power point for every 150 square feet of floor area This not only permits greater convenience and variety in illumination by means of portable lamps, but allows for the operation of household electrical appliances without the necessity of plugging them into a lamp socket.

Power points should be placed at a height which will make them readily accessible and will obviate the dragging of cords. A height of eighteen inches above the floor has been found satisfactory for most conditions.

In the bathroom and kitchen, power points should be placed 48 inches above the floor, as they are then more accessible for the appliances used therein.

Although wall brackets are decorative and tend to enliven the living room, they should not be depended upon as sources of lighting for utilitarian purposes. Such fittings usually give best results when mounted about 72 inches above the floor level. Utilitarian brackets used for the lighting of mirrors and for the lighting over the sink in the kitchen should be so arranged that the light source is 66 inches above the floor.

Switches and their location should be chosen from the viewpoint of convenience, appearance and service. Generally the most convenient position is at the knob side of the most used doorways and about 48 inches from the floor.

Good Wall and Ceiling Finishes

Wherever possible, walls and ceilings should be light coloured, but not so bright as to cause glare. A room having a cream ceiling and walls down to the picture rail and the remainder of the walls in deeper cream or buff should give satisfactory results from both the artistic and utilitarian aspects. Dark colours should be avoided as much as possible, as they absorb light.

(Continued on next page)

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Schedule of Lamp Wattages for Various Rooms

One watt of electricity for every square foot of floor space is considered to be the minimum requirement for good lighting conditions in living-rooms and the like. The amount of light, however, depends greatly upon the function for which the rooms are used.

A simple method of calculating the required illumination or required wattage by the "Lumen" method is given below

L = lumens required per outlet (for size of lamp refer to Table No. 1).
A = area to be lighted.
F = foot-candles required
N = number of outlets.
K = co-efficiency of utilisation; an average figure being 0.35 for medium coloured walls and ceilings.

$$\text{Then } L = \frac{A \times F}{N \times K}$$

TABLE No. 1

Approximate Values of Lumens Output—Gas-filled Lamps—200-250 volts.

Watts	60	75	100	150	200	300	500	1000
Total lumens	570	790	1160	1920	2800	4450	8300	18,500

The average foot-candles required to give satisfactory illumination for various classes of service are as follows.

Porch	1.0
Hall	1.5
Living Rooms	4.0
Kitchen	4.0
Bedrooms	[illegible]

TABLE No. 2

ROOM REQUIREMENTS

Room	Type of Centre Fixture	Suggested Wattage of Each Lamp	No. of Wall Brackets	Suggested Wattage of Each Lamp
Living-Room	Semi-indirect or Indirect bowl or 3 or 5 light Candelabra fixture	100-200 25-40	2 2-light, or 4 1-light	25-40
Dining-Room	Direct lighting fixture suspended over table	100	2	25-40
Kitchen	Enclosing unit suspended or mounted on ceiling	100-150	1 over sink 1 over stove	40
Bedrooms	Enclosing unit or semi indirect bowl	100	2 (on either side of dressing-table) 1 table lamp or bracket over bed	25-40 40
Hall	Small enclosing unit or lantern	25-40		
Bathroom	Enclosing unit mounted on ceiling	60	2 (one on either side of mirror or 1 above mirror)	25-40
Laundry	White shade or enclosing unit	100		
Garage	Enamelled iron shade	100		

Floor Standard.

Hanging Bowl

Selection of Lighting Fixtures

In the selection of lighting fixtures it should be borne in mind that they should harmonise with the general furnishings of the room and at the same time distribute the correct amount of light at the required points

A dining-room requires a centre fixture which will throw the light down upon the table. Wall brackets may be used to enhance the general beauty of the room

A bedroom requires general lighting from a centre fixture and, in addition, a bracket lamp should be placed at each side of the dressing-table mirror. A plug and switch on the wall for operating a bedside reading-lamp is also an attribute to comfort in this room.

The kitchen requires an even distribution of light and this can be best effected by a centre fixture. The provision of bracket lights over the sink and stove is a desirable feature.

Kitchen Unit.

The bathroom is best lighted by a bracket lamp on each side of the mirror in a large bathroom however, a centre fixture may also be required.

Entrance halls and stairways require general illumination furnished from centre fixtures Wall brackets may assist in the lighting of irregular halls and stairways and also add to their beauty

(Continued on next page)

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

OFFICE LIGHTING

Office Lighting Requirements

There are two essentials for office lighting—(a) *adequate quantity* of light to permit of clear, quick vision, and (b) *good quality* of light to prevent eye strain and eye fatigue.

From basic scientific facts on light and vision and from practical experiments it has been ascertained that a uniform illumination of at least 10 ft. candles is desirable for the usual class of office work.

The quality of illumination should be such that, although the lighting is bright, there are no objectionable shadows cast

Types of Lighting Units

To achieve the highest standard of illumination the office is best illuminated by means of an indirect lighting fixture. Through the medium of this type of fixture the light from the lamps is directed to the ceiling, from whence it is reflected downward on to the working level as a diffused comfortable illumination. In cases where the office ceiling is of a dark colour, it is advisable to use semi-indirect lighting fixtures to accomplish the same final result. In some cases, however, the ceiling may be too dark for even this type of illumination, in which case, direct lighting must be used. If this must be resorted to, the direct lighting fixtures should be placed in such positions that they will obviate as much as possible objectionable shadows which are likely to result

Lighting Recommendations

To obtain efficient lighting with indirect or semi-indirect lighting units, the ceiling and upper side walls should be kept light in tone—white or light cream—and all glossy finishes should be avoided.

The following table shows the recommended spacing distance between lighting units, etc., for various ceiling heights

Ceiling Height (feet)	Spacing distance between Units		Maximum distance from outside units to wall (feet)	Suspension distance from ceiling to top of reflector (feet)
	Usually recommended (feet)	Maximum permissible (feet)		
[illegible]	[illegible]	9	3½	1½
[illegible]	9	10	4	1½
[illegible]	10	12	4½	2
12	[illegible]	13	[illegible]	[illegible]
[illegible]	[illegible]	15	[illegible]	[illegible]
[illegible]	11–13	16	6½	

The number of lighting units obviously depends upon the floor area. In a small office (area less than 400 sq. ft.) with the usual ceiling height of 10 to 12 ft., one lighting unit of the indirect or semi-indirect type for every 70-90 sq. ft. of floor area is recommended and the area per lighting unit should not exceed 100 sq. ft. In a large office (area more than 400 sq. ft.) with the ceiling height of 10-12 ft., one indirect or semi indirect lighting unit for every 90 to 110 sq. ft. of floor area is recommended, and the area per lighting unit should not exceed 145 sq. ft.

The following table gives the proper lamp size based upon the foregoing recommendations

Size of Office	Floor area per lighting unit	Lamp size
Offices requiring one or two lighting units	Less than 70 sq. ft. 70-125 sq. ft 125-225 sq. ft	150 watt 200 watt 300 watt
Offices requiring four lighting units	[illegible]	[illegible]
Offices requiring six or more lighting units	[illegible]	[illegible]

Semi-Indirect "Keldon" Unit

Semi-Indirect Prismatic Top

Indirect Unit Luminaire

Enclosing Globe, with Single Chain Suspension.

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

SHOP LIGHTING

Floodlight.

The progressive shopkeeper of to-day is fully alive to the fact that light is his most efficient salesman, and serves him well for an astonishingly small salary The employment of this economic agent to the fullest extent is therefore imperative. The question is not whether he can afford good lighting, but whether he can afford to be without it; for it has been proved conclusively that the public buy where the light is bright

Conservation of Light

Apart from glare, the hanging of pendants in a window is extremely wasteful of light—see Fig (i) Of the total light given by the lamp only one third illuminates the display, the remainder being wasted in lighting the ceiling or passing out of the window into the street. The proper control of light by modern lighting equipment, as shown in Fig (ii), adds materially to the effectiveness of a display

Arrangement of Reflectors

The essence of good modern window lighting is to light the goods brilliantly while completely screening the lamps and reflector from the view of the public. It is usual to install the reflectors at the top front of the window, and to conceal them by means of a pelmet, usually of cloth, placed between the reflectors and the window This method of installation is clearly shown in Fig. (iii).

An alternative method of screening the lamps from view is that of recessing the reflectors in a false ceiling, as shown in Fig. (iv). This method is especially desirable when the window has a return, as it provides a ready means of concealing the reflectors from any angle.

Fig (v) shows yet another method of installation which may be employed when the window is in course of construction, the ceiling being recessed to accommodate the reflectors.

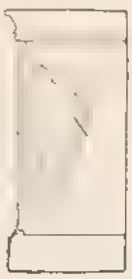
When reconstructing lofty windows, it is customary to install the reflectors level with the transom bar, the pelmet being draped below. Where the frieze consists of decorative glass, some lighting may be provided to make it luminous, or the space in the frieze can be used for display purposes and lighted separately.

Colour Lighting

Colour lighting makes an irresistible appeal to the public, and thus gives the shop increased advertising power. In some instances, the introduction of colour not only improves the appearance of the display as a whole, but adds to the selling value of individual articles.

Many shopkeepers are installing lighting systems which give the necessary flexibility of colour arrangement to ensure the best results from any display

(i) Incorrect method glaring and inefficient.



(ii) Correct method of light concentrated on display

Diagram Showing Necessity of Controlling Light by Reflectors.

Colour can be obtained by using colour sprayed lamps in place of clear ones, or more effectively, by fitting colour frames over the mouths of the reflectors A wide range of coloured glasses and gelatines is available to produce any desired colour combination

Spotlights and Floodlights

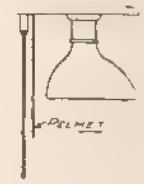
In addition to general window lighting, spotlights and floodlights should be installed for giving special emphasis to certain features in the display Spotlights direct an intense beam on a small object, while the floodlight covers a larger area. Colour fitments may also be used with spotlights and floodlights. Directional fittings of this type can be used with excellent results for after-hour lighting where it is undesirable to leave all the window lights on.

Shop Interiors

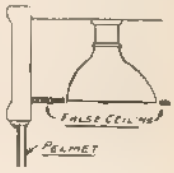
It is an established fact that a well-lighted shop interior reduces sales resistance It is not only desirable to have enough illumination to facilitate the handling of materials, but that the intensity of illumination should induce a sales atmosphere. The old-fashioned pendant should find no place in the modern shop, the lighting it provides is crude and glaring The amount of illumination required will, of course, depend on the character of the business

Architectural Lighting

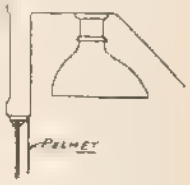
Architectural lighting is the most up-to-date of all methods of shop lighting. It is deliberately designed to form part of the main structure. With the aid of modern electric lighting it is possible to attain new effects by varying the intensity, direction, and colour of the illumination. Lighting features are embodied as an integral part of the building Full use can be made in the shop interior of lights in the frieze, lighted panels, luminous columns and beams, and lighted doorways. When employed scientifically, it is possible to obtain high intensities of light throughout the shop without any semblance of glare



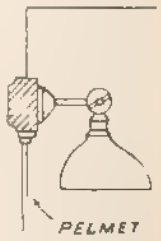
(iii) Ceiling Mounting



(iv) False Ceiling Mounting



(v) Recessed Mounting



(vi) Transom Bar Bracket Mounting

Advance Planning to Architects, etc.

The Electricity Sales Branch of the State Electricity Commission of Victoria has a technical staff available for assisting architects, manufacturers, etc., in the selection of the most suitable electrical equipment for any specific service. An outline of some of the principal activities of this branch are:—

POWER.—The Power Sales Section deals with the application of electricity for power or heating purposes in factories, etc.

ILLUMINATION.—This Section functions by tendering advice on all illumination matters, and generally aims at increasing the standard and efficiency of lighting.

RURAL.—The Rural Section is devoted to the application of electricity to farming.

MERCHANDISING.—This Section covers the sale of electrical appliances for both domestic and commercial establishments.

Architects and others interested in the best utilisation of electrical apparatus are invited to communicate with the above branch of the Commission

(Continued on next page)

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FACTORY LIGHTING

Value of Correct Illumination

Factory lighting should not be considered merely as a necessary service equipment to enable workmen to see. Light can earn direct profits if it is used for that purpose. Abundant illumination is a producer — not a burden. It has been proved by experience that modern factory lighting will increase production, decrease departmental costs and spoilage, and prevent accidents. Poor lighting costs money, but good lighting makes money.

Measurement of Light Intentity

Light intensity cannot be accurately judged by merely looking at the appearance of the lighted room. The only safe way to be sure of the lighting intensity is to measure it, and in this respect the foot-candle meter is the most accurate method.

The importance of measuring the lighting cannot be too strongly impressed, for therein lies the solution to satisfaction.

Intensity of Light Required for Various Work

The minimum foot candles required to give satisfactory illumination for various types of service in factories is given as under.

[illegible]	Minimum foot candles	Desirable foot candles
Storage rooms	[illegible]	[illegible]
Rough manufacturing and other operations	[illegible]	[illegible]
Fine manufacturing work	[illegible]	[illegible]
[illegible] embroidery, [illegible]	[illegible]	[illegible]

Types of Reflectors

The Distributing Type (Fig. 1) —

[illegible] It is of large diameter and is capable of distributing an even intensity of light over a large [illegible] of the lights.

The Concentrating Type (Fig. 2)—

This type of reflector is usually employed where it is desired to increase the light intensity at a particular machine or spot without increasing the general intensity of light throughout the whole factory. It is usually of comparatively small diameter and has either a bright white or polished surface inside. The reflector should be of a depth sufficient to conceal the lamp from the naked eye.

The Parabolic Angle Reflector (Fig. 3)—

This type of reflector is designed for lighting both horizontal and vertical areas from a side position. This reflector can also possess the qualities of either the distributing or the concentrating type.

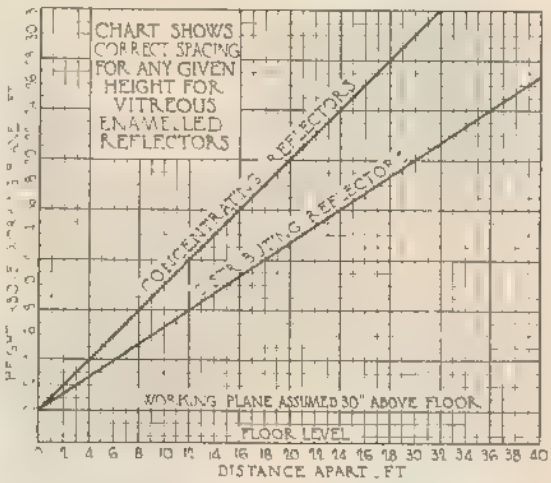
The Elliptical Angle Reflector (Fig. 4)—

The elliptical angle reflector is used in cases where machinery, such as travelling cranes, etc., occupies the centre of the space and it is therefore impossible to hang lighting units other than at the sides of the space. This reflector, which has a wide lateral distribution, provides a very even intensity over the space to be illuminated.

Spacing and Mounting Height

The following chart will assist in the correct spacing and mounting of various types of reflectors. It will be seen that the distance between properly installed reflectors is in constant proportion to the mounting height. This ratio remains constant for all sizes of reflectors of any one type, but the ratio of each type is different from that of the others.

The correct spacing is obtained by locating the intersection of the horizontal line, representing the mounting height, and the diagonal line, representing the type of reflector.



Lighting Service

The State Electricity Commission of Victoria maintains an Illumination Section, which at all times is ready to give free service in the way of lighting lay-outs, specifications, etc.

Fig. 1
Distributing Type

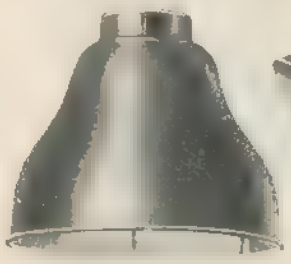


Fig. 2
Concentrating Type

Fig. 3
Parabolic Type

Fig. 4
Elliptical Type.

REFLECTORS

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31 f

BRITISH GENERAL ELECTRIC CO. LTD.

MAGNET HOUSE, 104-114 CLARENCE STREET, SYDNEY

BRANCHES.
Magnet House, 388 Bourke St. Melbourne.
Magnet House, 141 Scott St., Newcastle
Magnet House, 370 Murray St., Perth, and at Wellington, Auckland and Christchurch, N.Z.

SOLE AGENTS
Brisbane: Norman Bell & Co. (Pty.) Ltd
Adelaide: A. G. Healing Ltd.
Hobart: Electrical Agencies; and at Suva, Levuka, Fiji.

B. G. E.

"GENALEX"

COMMERCIAL AND ARTISTIC LIGHTING EQUIPMENT

In these pages there is catalogued a small selection of the most modern lighting equipment in the newest designs. In addition, we advise that the services of our overseas specialists in the Illuminating Department and Research Laboratory of the General Electric Company Ltd., England, are at your disposal for the study of any of your illuminating problems.

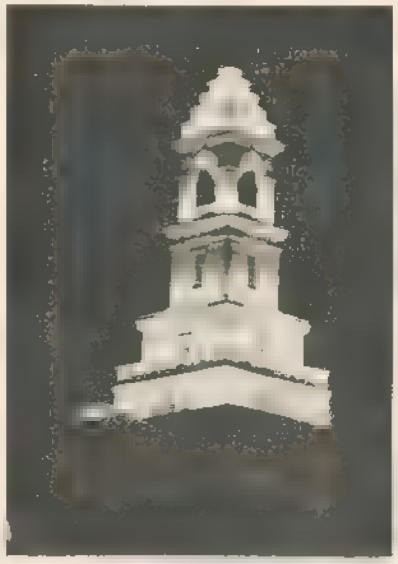
GECORAY (MADE IN ENGLAND

SHOP WINDOW AND ARCHITECTURAL LIGHTING

There is a "Gecoray" for every job. Stocks of Cornice and Architectural types are always maintained. Gecorays are British-made and constructed as the result of prolonged research and experiment.

Britalux

Obtainable 8 in., 10 in., 12 in., 14 in., 16 in., 18 in., suiting lamps up to 500W.



FLOODLIGHTING

Above is shown an excellent example of B.G.E. Floodlighting—the T. & G. Tower, Sydney. Our floodlighting experts, with comprehensive stocks of the latest equipment at their disposal, are in a position to advise on any illuminating job, large or small.

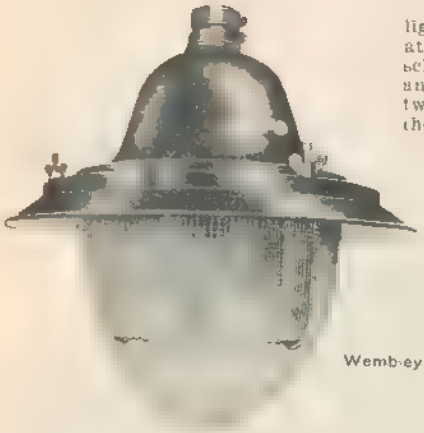
Gecolite

Obtainable 10in., 12in., 14in., 16-in., suitable for lamps up to 300W.

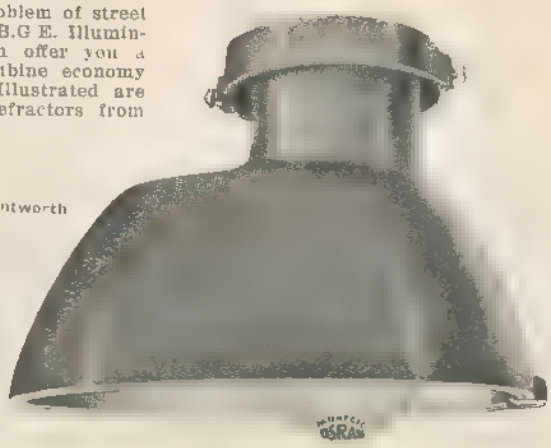
From the collections of Sydney Living Museums / Historic Houses Trust of NSW

STREET LIGHTING

No matter what problem of street lighting there is, the B.G.E. Illuminating Specialists can offer you a scheme that will combine economy and effectiveness. Illustrated are two of the G.E.C. Refractors from the range in stock.



Wembley



Wentworth

"MAGNET" BAKELITE ACCESSORIES

"Magnet" Shock-proof Bakelite Accessories enjoy a wide and well deserved popularity with Architects, Consulting Engineers, Builders, and all users who must have electrical accessories which combine a maximum efficiency, good appearance and reasonable cost.

A most complete range of Electrical Accessories is available, comprising Switches, Plugs, Sockets, Switchplugs, Lampholders, Ceiling Roses, Adaptors, Connectors, Bells, Buzzers, Transformers, etc. Two very popular lines which have an application in practically every installation are the new Ceiling Rose and the well-known Cordgrip Lampholder.

"MAGNET"

Bakelite Ceiling Rose

[illegible] an insistent demand, [illegible] Magnet Bakelite Ceiling [illegible] has been manufactured [illegible] match the range of "Magnet" [illegible]

Main terminals are of ample size for looping and are of one piece construction with flexible terminals, which are of the pillar type.

Flexible cords are gripped by the Magnet Patented Ball and Socket method.

The design aims at simplicity [illegible] wide application and time-saving wiring.

"Landor" Shockproof Combined Switch plug. S 403 10 amp. 250 volt 3-pin (flat)

This Shockproof combined switch with flat pins (2-pin and earth) is manufactured by the General Electric Company Ltd. of England expressly for the Australasian market. Special features are:—

- Switch fitted with "Landor" rapid make and break movement 10 ampere.
- Switch Cover cannot be unscrewed—fitted with two fixing screws.
- Plug Receptacle portion fitted with "phosphor bronze" contact pillar terminals.
- Recess at back for wires—no necessity for wood blocks.
- Strong robust bakelite plug top with side entry for flexible fitted with cordgrip and cover plate to ensure rigidity of pins.

"MAGNET"

Bakelite C.G. Lampholder

Being all insulated these Lampholders are particularly [illegible] for [illegible] Warehouses, damp situations generally, and positions where stone floors are uncovered.

Heavy Duty Plunger Contacts with external springs, which definitely do not carry current, are two of the outstanding features of the Lampholders.

As in the case of the Ceiling Rose, flexible cords are gripped by the "MAGNET" Patented Ball and Socket method.

For Safety, Service and Satisfaction specify—and see that you get—Genuine "MAGNET" Bakelite Accessories made in England.

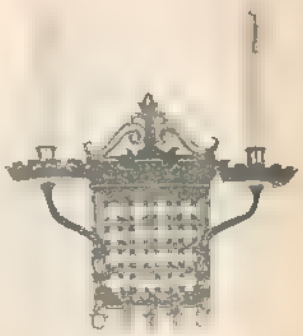
From the collections of Sydney Living Museums / Historic Houses Trust of NSW

BRACKETS

To suit special room furnishing and to tone with unusual colour schemes, a large and comprehensive range of wall brackets is available

Pictured are six designs of brackets, each a masterpiece of its type and typical of the high order of finish and quality of the entire range

Cromwe
F 8085



E izabeth
F 8259

Perlique
F 8287

Louis
F 8217

Hal
F 8141

Med um
F 8273

"OSRAM" ELECTRIC LAMPS

Every Osram Lamp that you buy has been made and tested according to the specification of the British Engineering Standards Association (No 161/1930) An Osram Lamp maintains a high degree of brilliance during the whole of its guaranteed life.

The brilliance of Osram Lamps must not be regarded as indicating high current consumption Cheap, low grade lamps will use no less current than Osram, but cannot give the same brilliance and the same long service.

At the Osram works in England some 3,400 different types of lamps are manufactured. These range from the tiny torch bulb to the powerful 10,000 watt lamp for lighthouse work.

The Osram range, therefore, includes lamps for every purpose Most of these are now entirely Australian made, and the Australian-made products are fully maintaining the prestige so long associated with the word "Osram."

Gothic

Huntalite

Opal Tubular Lamp

Candle Twisted Lamp

Plain Candle

Standard Types

For general use the **Pearl Osram Lamp** is becoming most popular and satisfactory Though no more costly than clear gas-filled lamps, the Pearl Osram is completely free from glare, giving an even diffusion of light with only 2 per cent absorption. Other Osram Standard types are Clear Gas Filled Lamps Clear Vacuum Lamps Osram Daylight Blue Lamps (for shops and homes where daylight lighting is needed) and Osram Pilot Lamps either clear or red sprayed

Commercial Types

Candle Lamps for decorative lighting Tubular Lamps for lighting in the more inaccessible corners, Striplite Lamps for shop windows and special home lighting and "Robertson's" Radiator Lamps—all are obtainable under the Osram brand with the Osram reputation of quality and service.

Ready stocks are also held of Carbon Lamps, Projection Lamps Floodlight Lamps, Sign Lamps Natural-coloured Lamps, Colour sprayed Lamps and "Osglim" Neon Lamps

Special Decoration and Festoon Outfits are also available at extremely moderate prices.

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

WM. BEDFORD LIMITED

476-90 LITTLE LONSDALE STREET
MELBOURNE

ELECTRIC LIGHT FIXTURES

31 f

S.A.A. File No.

(For Other Products, See Index)

Products

Electroliers of any size, pendants, internal and external brackets, newels, floor and table standards, verandah and pier lights ceiling lights, internal and external lanterns, candlesticks, etc.

Manufacture

As manufacturers of bronze electric light fixtures, Wm. Bedford Limited stand alone in the Continent of Australia.

The chandeliers at the Regent Theatres, Melbourne and Brisbane, and the Palais Theatre, St. Kilda, also the huge dome central feature at the Town Hall, Brisbane, are the largest of their kind in the Southern Hemisphere.

Designing Service

Wm. Bedford Limited's designing staff is solely engaged upon the creation of original electric fixtures. The services of the staff can be made available to those in the profession, if so desired. A consultation frequently enables fittings to be produced in the most economical and satisfactory way.

Wm. Bedford Limited employ only the most skilled artisans, and, in consequence, Architects may be assured that their exclusive designs shall be made up completely in accordance with the detail and to their entire satisfaction.

Fixtures of any size can be designed and manufactured, and we instance a few of the larger fittings as follows:

Town Hall, Brisbane Dome — Diameter, 16 ft., Weight, ¾ ton.

Regent Theatre, Chandelier Height, 17ft. 6in., Diameter, 11ft 6in.; Weight, 1 ton.

Regent Theatre, Brisbane Chandelier — Height 17ft.; Diameter, 10ft. Weight, 1 ton.

Palais, St. Kilda, Chandelier — Height, 12ft. Diameter, 7ft. 6in., Weight, ¾ ton.

Reliable judges have stated definitely that Bedford's fixtures are equal, if not superior, to any turned out in other parts of the world. There is a limitation in design and range to the imported fixtures which means that the purchaser cannot be sure of exclusive designs, nor have sufficient range for selection.

The services of Bedford's designers are at your disposal; use them for the Theatre job, the Hall—the Church and the Home — and insist upon having your creations exclusive to yourself.

An Arcade Lighting Fixture, Manchester Unity Building. Marcus R. Barlow, F.R.A.I.A., Architect.

LIST OF INSTALLATIONS

The following is a list of the more prominent Theatres erected in the last few years equipped with Wm. Bedford Limited's fixtures.

Palais Theatre, St. Kilda. H. E. White, Architect.

New Grandy Theatre, Melb. C. N. Hollinshed, Architect.

Regent Theatre, Melbourne. C. H. Ballantyne & Associates, Architects.

Plaza Theatre, Melbourne. C. H. Ballantyne & Associates, Architects.

Regent Theatre, Brisbane. C. N. Hollinshed, Architect.

Regent Theatre, Fitzroy. C. N. Hollinshed, Architect.

State Theatre, Melbourne. Bohringer Taylor & Johnson, Architects.

State Theatre, Sydney. H. E. White, Architect.

Civic Theatre, Auckland, N.Z. Bohringer, Taylor & Johnson, Architects.

Palmerston North Theatre, N.Z. C. N. Hollinshed, Architect.

Plaza Theatre, Sydney. Heath, Architects.

Municipal Theatre, Newcastle. H. E. White, Architect.

The following Halls, Clubs, Churches, etc., are a few to which Bedford's made fixtures were supplied.

Town Hall, Brisbane. Hall & Prentice, Architects.

Masonic Hall, Brisbane. Atkinson, Powell & Conrad, Architects.

[illegible] & G. Buildings, Sydney. A. & K. Henderson, Architects.

[illegible] & G. Buildings, Melbourne. A. & K. Henderson, Architects.

Bank of N.S.W. Robertson & Marks, Architects.

Yarra Yarra Golf Club. Plottel, [illegible] & Alsop, Architects.

Lake Karrinyup Country Club, W.A. E. & R. Summerhayes, Architects.

Lister House, Adelaide. F. Kenneth Milne, Evans & Russell, Architects.

Athenaeum Club. C. H. Ballantyne & Assoc., Architects.

Howey Court. M. R. Barlow, Architect.

Roman Catholic Church, Essendon. T. A. & T. G. Payne, Architects.

Coburg Town Hall. C. R. Heath, Architect, Etc.

Norwich Union Buildings, Adelaide. F. Kenneth Milne, Evans and Russell, Architects.

Manchester Unity Buildings, Melbourne. Marcus R. Barlow, Architect.

Coles Building, Brisbane. Powell & Rae, Architects.

(Continued on next page)

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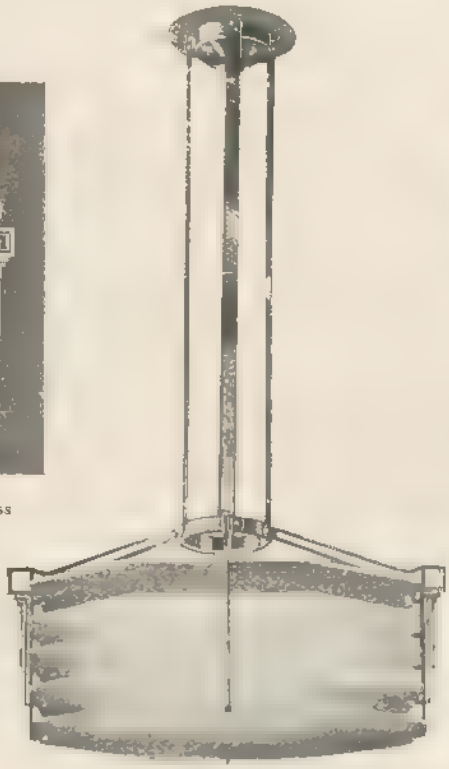
MODERN LIGHT FIXTURES

Illustrations on this page show light fixtures with a definite leaning towards the art moderne. The range of design and stock includes many fine examples of this influence and could be inspected by Architects. Wm. Bedford Limited can manufacture to the completest details the designs of the Architect.

M3. Moderne Pendant Frosted Glass

M2. Moderne Ceiling Fixture



M1—Five plate Modern Pendant (Frosted Glass)

M4—Moderne Ceiling Fixture. Sandblasted Glass

(Continued on next page)

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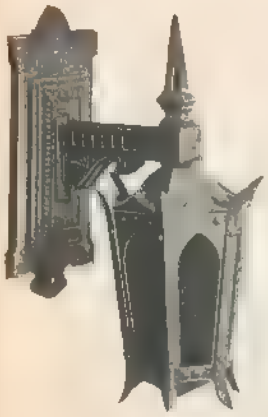
ELECTRIC LIGHT FIXTURES
PENDANTS AND BRACKETS



B 475.
EXTERIOR LANTERN BRACKET.
Verde Green on Brass o Black (Spanish) Finish
Lantern, 7½ x 10½ in.
Back Plate 15 x 7 in.

FOUR-TIER, TWENTY-FOUR LIGHT, CAST BRASS JACOBEAN ELECTROLIER

Spread Top Tier 20 in.; Second Tier, 25 in.; Third Tier, 33 in.; Bottom Tier, 41 in

B 527.

B 486.
EXTERIOR WALL BRACKET
Verde Green on Brass or Black Italian Finish
Back Plate, 9 x 4½ in.

B 529
SIX LIGHT CAST BRASS GEORGIAN PENDANT
Height, 24½ in Spread, 34 in

Illustrations on these pages are typical of the electric light fixtures for internal and external use, which Wm Bedford Limited can supply.

The range of stocks includes many fine examples of decorative art as applied to electric lighting and styles to suit any style of architecture or interior decoration

See Catalogue for other types.

B 457
CAST BRASS TORCH BRACKET.
Complete with 6in. Opal Globe
Height (overall): 18 in.
Projection: 9 in
Back Plate: 4½ in.

(Continued on next page)

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

MODERN HOME LIGHTING FIXTURES

A 22
Back Plate, 15 in. dia.
Spread, 9½ in. dia.
Projection, 5 in. dia

A 7
Back Plate, 10 in.
Spread, 4¼ in
Projection, 5 in.

A 15.
Back Plate, 5 in dia
Spread, 7½ in. dia.
Projection, 3½ in. dia.

A.13.
Back Plate, 4½ in. dia.
Spread, 11¾ in. dia.
Projection, 5¾ in. dia.

With the advent of the modern and Spanish Mission influence in recent domestic architecture, came the necessity for using light, attractive and appropriate light fixtures to harmonise with the general decorative scheme. As the Spanish Mission influence was introduced into very modest residences, the price of the fixtures had to be in proportion.

Wm. Bedford Limited has an excellent range of these fixtures (a few of which are illustrated) and are priced so reasonably that they can be specified in the most moderately-priced villa.

Finishes

As the fixtures are made in brass and bronze, they particularly lend themselves to any of the following finishes: Brass, Old Brass, Polochrome, Bruno Florentine, Florentine Verde, Relieved etc., in fact in any finish including Oxidised Silver, but the latter is extra.

A 16.
Back Plate, 9¼ in. dia
Spread, 10½ in. dia.
Projection, 4½ in. dia.

A.26.
Back Plate, 11½ in.
Spread, 9½ in.
Projection, 6 in

B 444
Back Plate, 10½ in. x 5 in.
Projection, 5½ in.
Spread, 9½ in

A.2.
Back Plate, 9¾ in.
Spread, 9in.
Projection, 4 in.

FOR OTHER FITTINGS, SEE CATALOGUE

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

B.G.E.

BRITISH GENERAL ELECTRIC CO. LTD.

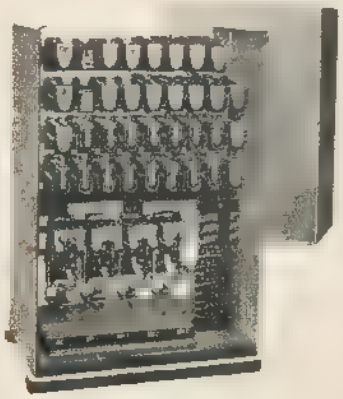
Head Office for Australasia: SYDNEY

BRANCHES AND SOLE AGENTS.
MELBOURNE, NEWCASTLE, BRISBANE, PERTH ADELAIDE AND HOBART
WELLINGTON, AUCKLAND, CHRISTCHURCH, N.Z. SUVA, AND LEVUKA, FIJI

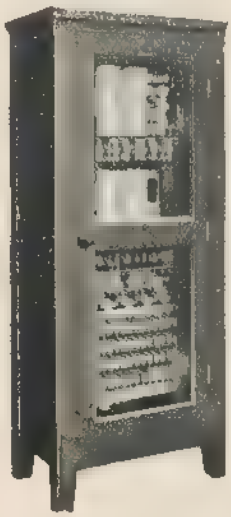
31*i*

S.A.A. File No.

G.E.C. P.A.X. EQUIPMENT



NO. 5,000



NO. 5,400

The above illustrations depict the modern type of Private Automatic Exchange equipment, which now supersedes all former types of push-button equipment.

Absolute secrecy is assured

Reliability of operation is ensured by the unique method of construction of Switches and Relays which cannot be worn out in ordinary service. Operation is foolproof and cannot be permanently deranged, no matter to what misuse the equipment is subjected

No tinkering is necessary. Lock them up—leave them alone—they will work! No. 5000 is a shelf or table model of 15 lines maximum capacity, operating on 12 volts supply. No. 5100 is a similar type to above but with a maximum capacity of 25 lines. No 5200 is a similar type to No. 5100, operating on a 24-volt supply. No. 5300 is a floor pattern switchboard with a maximum capacity of 50 lines operating on 24 volts supply. No 5400 is a floor pattern, operating on 24 volts supply, and can be started with 25 lines, which can be increased to over 1000 lines without alteration, just the addition of further units.

The current is obtained from batteries which are automatically charged in the case of A.C. supply from a rectifier, and in the case of D.C. supply direct from the mains through suitable switching arrangements.

G.E.C. P.A.X. EQUIPMENT

Type of Board	Max Lines	Min Lines	Operating Voltage	No. of Wires [illegible]	Maximum Distance in Miles. 20 Gauge Standard Cable	16 Gauge G.1 Wire	12 Gauge G.1 Wire.
No 5000	15	5	12	[illegible]	1 2[illegible]	0 5	1 25
5100	25	10	12		1 2[illegible]	0 5	1 25
5200	25	10	24	2	[illegible]	1 25	4
5300	50	25	24	2	3	1 25	4
5400	50 +	25	24	2	3	1 25	4

All Switchboards can be extended in steps of 5 lines. Gecophone secret table type telephone sets as supplied to the P.M.G.'s Department are used on all P.A.X. Extensions.

Only a double or triple conductor is necessary to connect the instruments to the Switchboard

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31 i

S.A.A. File No.

STANDARD TELEPHONES AND CABLES
(A'SIA LTD.)

Registered Office: 71 YORK ST., SYDNEY — Works: CHIPPENDALE, SYDNEY

Interstate Agents:

VICTORIA—Mr. C. R. Foster, 588 Bourke Street, Melbourne.

QUEENSLAND—Brisbane Electrical Co., 47 Elizabeth Street, Brisbane.

SOUTH AUSTRALIA—Messrs. Unbehaun & Johnstone Ltd., 98-100 Currie Street, Adelaide.

WEST AUSTRALIA—Messrs. Unbehaun & Johnstone Ltd., 383-387 Murray Street, Perth.

TASMANIA—Medhurst & Sons, 95 Collins Street, Hobart.

INTER-OFFICE PHONES

Products

Inter-office telephones, private automatic telephone exchange systems, magneto telephone exchanges, and all classes of telephones and radio communication appliances.

Teleprinters ("The electric messenger") for transmitting typewritten messages by wire to one or more distant points.

Inter-Office Telephone System

STANDARD inter-communicating telephones are especially manufactured and guaranteed to give quick and reliable communication between offices, departments and employees. Types, designs and circuits are manufactured to fill every requirement under all conditions, in new or old buildings, in offices, private residences, hospitals, ships or factories. Our valuable and extensive experience in the telephone field, also the engineering skill employed, enable us to offer equipment which has proved its efficiency and reliability under most severe operating conditions.

Preliminary Service to Architects and Engineers

Our Service includes practical demonstration of the operation of the systems to Architects and Engineers or Owners; complete co-ordination with the Architect or Engineer in the laying out of conduit and other details connected with the installation of the system.

Installation

We carry out the entire installation from the wiring to the mounting of telephones — and will undertake such installation work as sub-contracts in any part of the Commonwealth.

INTER-OFFICE TELEPHONES

SYSTEM No. 1 — Selective Ringing, Common Talking

Service

Each station can select and ring any station without disturbing others; as many conversations as there are pairs of telephones can be carried on at one time without interfering with, or being overheard by, the other Instruments, either table or wall type, are made in standard sizes, namely, 6, 12, 16, 20 and 24 line

Key Box

THE KEY BOX is finished in dull black enamel and is provided with the necessary number of push buttons for ringing and speaking purposes. It is suitable for mounting either on a wall or desk, and the handset is attached to it by means of a 6-ft. cord.

Cable

Special metallic circuit cable is made for each size of instrument and consists of the required number of cotton-covered enamelled copper wires twisted in pairs, one pair of 22 gauge wire for each telephone and two pairs 18 gauge wire for battery wires, and two spare wires for emergency use. Cables are furnished in two grades of outer covering, viz., lead-sheathed for use in outdoor or damp situations and fireproof braided for dry interior positions.

12-Line Key Box, with Handset

Particulars of Cables

Size of instrument	No. of pairs 22 gauge	No. of pairs 18 gauge	External diameter of lead covered cable	External diameter of braided cabl
6	7	2	.53 in.	.45 in.
12	13	2	.62 in.	.55 in
16	21	2	.70 in	.62 in.
20				
24	25	2	.75 in.	.67 in.

The cables can be run beneath the floors, on the skirting, picture rails, or in the walls, and are joined together by means of special cable terminals. In new buildings it is highly desirable that concealed conduit pipes of sufficient diameter be provided.

Cable Terminals

A cable terminal should be used wherever a junction is to be made between cables, for example, where an outside lead-covered cable is connected to an interior cable, or wherever a branch is taken off from the main cable. By a judicious use of cable terminals economy can be effected in the quantity of cable required.

Dimensions of Cable Terminals

Length (inches)	Width (inches)	Depth (inches)	Use with buttons
14	5¾	2½	16, 20 and 24
8	5¾	2⅝	6 and 12

Batteries

One battery of six to ten dry cells provides the current for talking and signalling. The batteries should be enclosed in a box near the centre of the system in an inconspicuous but convenient and dry place, such as on a shelf or in a cupboard. Generally a set of batteries will last from nine to twelve months, and are cheap and easily replaced.

Round Call

This consists of the use of one button on the key box and a number of loud ringing bells placed at different points of the building. By pressing the button all bells ring simultaneously, and by the use of code rings any member of the organisation can be quickly located. On hearing his code call, the wanted person proceeds to the nearest inter-phone and answers the call from there.

(Continued on next page)

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AUTOMATIC TELEPHONE SYSTEMS

Service

These systems are primarily intended for large installations that are beyond the capacity of the inter-phone or push-button systems, which are limited to a maximum of about 24 instruments. A small automatic telephone system is, however, manufactured, so that a choice of systems is available for smaller installations.

Automatic systems are supplied in the following standard sizes:

No. 7010 type—Maximum capacity, 21 lines

No. 7001 type— 35 lines (1 unit).
70 lines (2 units)
105 lines (3 units)
140 lines (4 units).

Larger equipments are available, particulars of which will be given on request.

Special Facilities

Special services can be given by the No. 7001 System when required. These comprise code calling, priority service, fire alarm and conference facilities.

The code calling feature enables a person to be located quickly by means of bells, when away from his telephone. Upon hearing his code call, the wanted person proceeds to the nearest telephone, dials his own number, and is then connected to the person calling. Priority service enables executives or other officials to break down a connection and immediately speak to a station which was engaged.

No. 7001—Automatic Unit, with doors removed. (1st Unit of 70-line Exchange.)

Power Plant

This consists of storage batteries and power board for charging the batteries. The No. 7001 system requires a 36-volt battery and the No. 7010 system a 24-volt battery. As the current drain is low in both systems, batteries of small capacity (20 to 30 ampere hours) only are required. Two separate batteries are usually provided, so that whilst one is operating the system the other is being charged. However, where alternating current is available for charging purposes, only one set of batteries is needed, as an automatic charging panel can then be used, which automatically cuts the charging equipment into circuit each time there are no calls up on the switchboard. This ensures the battery being in a fully charged condition at all times.

Telephones

A choice of three types of instruments (Nos. 2712, 2713, and 2718) are available for the No. 7001 system. The Nos. 2712 and 2713 are illustrated below, as is also the No. 2688 telephone which is used on the No. 7010 system. The No. 2718 set is for wall mounting and is equipped with fixed transmitter and hand receiver.

These telephones are of the latest pattern, and have only recently been developed. They are handsome in appearance, convenient to use, thoroughly efficient, and are used in large quantities as standard instruments in the leading countries of the world.

No. 2713—Automatic Wall Telephone

No. 2712—Automatic Table Telephone

No. 2688—Automatic Table Telephone

Advantages

The advantages given by the automatic system over the multi-button and manually operated systems are:

1. No comparatively expensive multiple wire cable to provide in connecting every telephone. Only one pair of wires are necessary to connect each instrument.
2. Additional instruments up to the limit of the capacity of the switchboard can be added as required with a minimum of expense and trouble.
3. No operator is required. Thus the operating cost is negligible compared with a manually operated switchboard.
4. The apparatus is ready for use day or night and absolute secrecy is secured on every call.
5. High speed of operation. There is no waiting, as the number is selected by the mechanism during the process of dialling.
6. The caller is instantly advised, by means of different tones, when the distant bell is ringing or when the station is engaged.
7. The apparatus is simple and economical to instal and may be housed in a position which would not be suitable for an operator.

(Continued on next page)

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SYSTEM No. 11
Private Line

Service

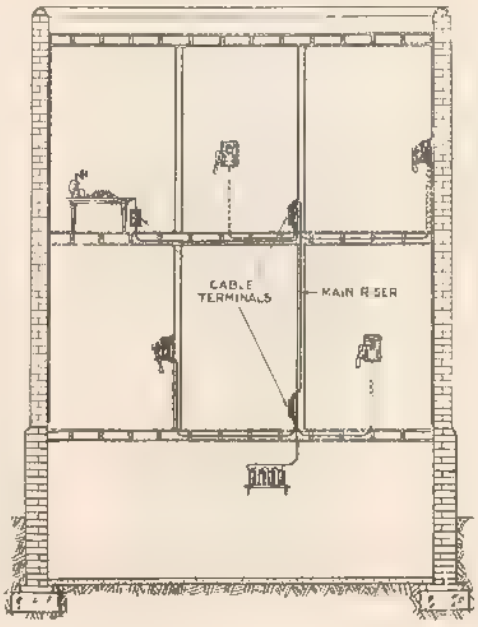
For use in residences, banks, institutions, warehouses, stores or other mercantile establishments where conversations can be limited to one at a time

Operation

Each Inter phone in the system is equipped with a number of push buttons (one for each other station in the system). By depressing the button marked with the name or number of the station wanted, the bell at that station will ring and there only Any station in the system can selectively ring any other station Only one conversation can be carried on at a time

Capacity

The wall type Inter-phones can be furnished in capacities of 2, 3, 4, 6 and 8 buttons, accommodating 3, 4, 5, 7 and 9 stations respectively in a system. The desk and handset Inter phones are furnished in capacities of 4 and 8 buttons, accommodating 5 and 9 stations respectively in a system.



Sectional View of Typical Installation.

SYSTEM No. 14
Two-Station Private Line

Service

For use where only two stations are required and where the sets are distantly located from each other.

Only two wires are used for connecting the Inter-phones, dry cells being required at each station

Operation

Either station can ring the other by simply depressing the push button of the set.

Systems for Hotels and Flats

Various systems are manufactured specially for hotels and flats. These consist of switchboards or shutter boards incorporating a signalling device for each apartment Inter-phone, to enable the operator to know which room has called.

Inter-phones are also manufactured for use in conjunction with letter boxes in flats, etc., door opening devices, connection to tradesmen's entrance, caretaker's quarters, etc

SYSTEM No. 12
Master Station, Common Talking

Service

Consists of one centrally located "Master Station" Inter-phone to which are connected other "outlying station" Inter-phones. The system provides for communication from a central point to different stations and vice versa

Operation

The Master Station Inter-phone is equipped with a number of push buttons; one for each outlying station in the system. By depressing the button marked with the name or number of the outlying station wanted, the bell at that station will ring and there only. The outlying stations are equipped with only one button, which will ring the Master Station when depressed Only one conversation can be carried on at a time

Capacity

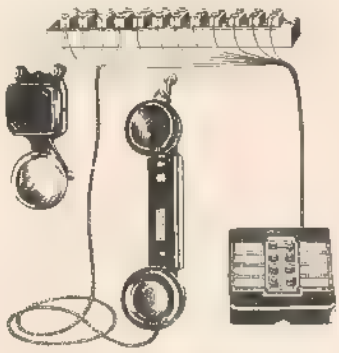
One Master Station and from two to twenty-four outlying stations.

Types of Interphones

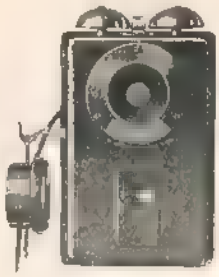
Wall, desk and handset Inter-phones may be used in this system for either the master or outlying stations.

Battery

One battery of three or four dry cells provides the current for talking and signalling. The batteries should be enclosed in a box and placed near the centre of the system in an inconspicuous but convenient and dry place, such as on a shelf or in a cupboard. Generally a set of batteries will last from nine to twelve months, and are cheap and easily replaced.



8-Button Master Set (Handset Type)



Outlying Wall Type Set

MAGNETO TELEPHONE SYSTEMS

The advantages of this system are the low initial cost of exchange equipment and the ability to operate successfully on long lines of which the insulation is not the best. The current for speaking is supplied by means of two or three dry cells located at each telephone, and ringing is effected by means of a hand magneto generator and ringer or bell, which are embodied in each instrument

A variety of magneto switchboards and telephones are available for every purpose. Switchboards are available in sizes from five lines upwards.

(Continued on next page)

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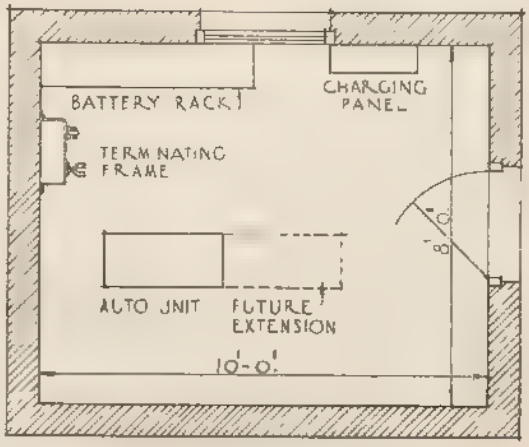
Installation and Location

When selecting the location of the automatic unit, several points have to be considered. In the first place a position should be chosen, if circumstances permit, which will enable the wiring to be carried out in the most efficient and economical manner. In addition, a position should be found for the equipment where it will not be subjected to vibration, or to dust, smoke, damp, acid fumes, or other disturbing influences. It can be assumed that any room which is suitable for human habitation will be suitable for housing the automatic unit.

A suggested layout for the automatic unit terminating frame, power plant and batteries, is shown opposite

The dimensions of each No. 7001 unit are 6 ft. high, 2 ft. 6 in. wide, and 1 ft. 3 in. deep. The battery rack usually consists of two shelves approximately 5 ft. long by 12 in. wide. The size of the terminating and arrester frame for a 35 line installation is approximately 2 ft. wide by 20 in. high. In view of the smallness of the No. 7010 unit, this can be conveniently mounted on a table or in a cabinet with the batteries, charging equipment, etc., in close proximity



Layout of Automatic Unit

TELETYPE — THE ELECTRIC MESSENGER

The Teletype is a telegraphic typewriter that transmits a typewritten record over an ordinary telephone line, irrespective of distance. It is the latest and most efficient aid to the art of communication, and consists of a set of typebars similar to that of the typewriter. These typebars are mechanically thrown against a platen, thus causing a letter to be printed at both the home and distant end. The electrical equipment consists of five small selector magnets for actuating the code bars, a sixth pulse magnet, which starts the operation of the printer, and a small motor which drives the mechanism.

The Teletype eliminates a great many of the errors and delays that occur in any business. It types its message on paper simultaneously on any number of machines at any distance. It can be used with, or as a substitute for, telephones, tubes and messengers; to speed up the execution of orders, and is of infinite value where the factory or warehouse is situated some distance from the offices

The Teletype is operated just like an ordinary typewriter, and is fast in operation—60 words per minute It requires no one at the receiving end, but automatically taps out its messages, which are taken from the machine and acted on immediately It produces a double check on every transaction—prints its message at both sending and receiving end

ARCHITECT'S SPECIFICATIONS — INTER-OFFICE TELEPHONES

EXTENT OF WORK

This contract covers the supply and installation, ready for service, of an inter-communicative service for the respective points set out as follows:..... ....(or, as indicated on drawings Nos..... ..) and includes No..... wall type and No. ... .desk instruments, samples of which shall be submitted and approved of before the acceptance of the contract.

SERVICE REQUIRED

The service required to be performed by the instruments shall be: -

a. Selective Ringing—Common Talking.
or b. Selective Ringing—Selective Talking.
or c. Master Station—Common Talking
or d. Two-Station Private Line.

INSTRUMENTS

The size of the instrument shall be to the nearest standard size that will cover the number of points required.

Instruments shall be of type calculated to withstand heavy and continuous traffic condtions. The name of each person called by such an instrument shall be neatly and clearly shown and secured by means of an approved holder. Wall sets shall be firmly secured in a workmanlike manner, and, unless otherwise directed, fixed at a height of 4 ft. 6 in. from the floor measurement to centre of instrument.

MATERIALS

Cables shall consist of multi-core metallic circuit, each wire being of high conductivity copper, enamelled and double cotton insulated; one wire of each pair shall be coloured for identification. The bunched conductors shall be taped and impregnated with wax and protected with an outer covering of lead (or braiding, if specified).

WORKMANSHIP

Cables shall be neatly installed and, where necessarily exposed, be as inconspicuous as possible. Where subject to injury, they shall be enclosed in approved conduit and painted to match the surroundings.

Junction boxes, of an approved type, and fitted with a suitable cover, shall be used when two or more cables are joined.

POWER UNIT

The complete system shall be operated by means of approved low amperage, low internal resistance dry cells enclosed in a suitable battery box, and placed in a convenient position where directed.

GUARANTEE — FREE MAINTENANCE

The work shall be carried out to the satisfaction of the Architect and guarantees of free maintenance shall be specified by the tenderer.

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31 k

S.A.A. File No.

THE ASSOCIATED GENERAL ELECTRIC INDUSTRIES LTD.

SYDNEY — MELBOURNE — ADELAIDE — BRISBANE — PERTH — HOBART

(For a complete list of branch offices, see page 422)

EDISON ELECTRIC COOKING AND BAKING EQUIPMENT

MANUFACTURED IN AUSTRALIA BY ASSOCIATED GENERAL ELECTRIC INDUSTRIES LTD, AUBURN N.S.W

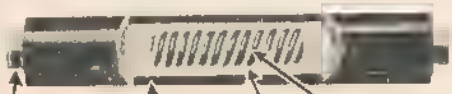
Products

Edison Heavy Duty Electric Cooking and Baking Equipment consists of a complete line of electrically-heated Bake and Roasting Ovens, Ranges, Broilers, Urns, Steam Tables, Stock and Fry Kettles, Griddles, Waffle Irons and Toasters.

Edison Electric Heavy Duty Cooking Equipment

The Edison Co. is the World's largest manufacturer of Commercial Electric Cooking and Baking Equipment. In thousands of hotels, restaurants, hospitals, clubs and institutions this equipment is giving superior service.

This equipment is the result of fifteen years' experience. The patented Calrod Unit in Edison Ranges, etc., provides efficient, economical use of electricity in addition to the advantages of cleanliness, conservation of cooking space and flexibility. The Edison appliances illustrated on this page are now made in Australia



SECTIONAL VIEW OF CALROD.

THE PATENTED CALROD HEATING ELEMENT

Architects and engineers, familiar with the problem of more rapid oxidation of element and terminals under high temperature operating conditions, with the problem of properly insulating and supporting resistance wire, of protecting it from possibility of physical damage, and knowing the higher utilisation efficiency of direct-contact heating, recognise the Calrod element as the ultimate achievement in electric heating efficiency and economy.

Vitrified Magnesite, when solidified, is both a perfect electrical insulator and an excellent conductor of heat. It is in no way affected by high temperature.

After the helical coil of Calorite has been suspended in the seamless steel tube, completely insulated and supported by packed, powdered Magnesite, the tube is swaged down, by a tremendous power, to a smaller diameter. The Magnesite is thus compressed as hard as granite, completely excluding all air and eliminating possibility of oxidation. Calrod then is in effect a solid rod, capable of being bent or shaped as required for any application

Another rugged feature is the terminal construction. The Calorite resistance wire is threaded on to long heavy terminals of pure nickel well inside the protecting sheath. They extend a suitable distance out of the tube so that the connection can be made in a cool place, well removed from the high temperature zone. This does away with all possibility of terminal trouble.

Kitchen Equipment Service

Our specialised experience will be helpful and profitable to you and your clients

If you call on us we will gladly assist in the preliminary stages of planning Kitchen and Bakery installations. The flexibility and variety of our equipment enables us to assure satisfactory and economical service irrespective of the output required.

Advantages of Edison Equipment

Edison Electric Cooking Equipment has the following advantages:—

(1) Simplicity—just the turn of a switch starts the heat; each switch indication assures the accurate amount of heat exactly as desired.

(2) Less floor space required—i.e., two Edison ranges are more than equivalent in total cooking capacity to three fuel type ranges of equal floor space. Likewise with Edison Baking and Cooking Ovens, one three-deck oven is the equivalent of three fuel ovens.

(3) Architectural advantages. This equipment can be located in any part of the building with less consideration given to ventilation, etc.

(4) Lower upkeep cost. The first electrical cooking and baking equipment made by this company (20 years ago) is still in daily use. The patented CALROD heating element cast inside the solid iron hot-plates is forever sealed and protected against oxidation or physical damage

(5) Better Cooking and Baking; Cleanliness; Coolness; Banished Fire Hazards.

Type AHC-D Edison Heavy Duty Range.

CAPACITY.
Capable of Catering for up to 150 persons per meal

DIMENSIONS.
Overall—
Height 31in., Depth 43in., Width 64½in
Each Oven—
Height 13⅞in., Depth 26in., Width 19in

WATTAGE.
Four 4 KW Boiling Units
Two 3 KW Oven Units
Total 28 KW

Ad-A-Deck Heavy Duty Electric Bake Ovens.

Catalogue No.	Floor Space. Width. Depth. In Inches.	No. of 16 x 28in. Trays.	Kilowatts.
A.H.R.7	51 x 43	2	6.3
A.H.R.14	51 x 43	4	12.6
A.H.B.4	52 x 73	4	8.3
A.H.B.8	52 x 73	8	16.6

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B.G.E.

BRITISH GENERAL ELECTRIC CO. LTD.

Head Office for Australasia: SYDNEY

BRANCHES AND SOLE AGENTS:

MELBOURNE, NEWCASTLE, BRISBANE, PERTH, ADELAIDE AND HOBART.
WELLINGTON, AUCKLAND, CHRISTCHURCH, N.Z. SUVA, AND LEVUKA, FIJI.

31k

S.A.A. File No.

HEATING AND COOKING WITH "MAGNET" EQUIPMENT

Magnet

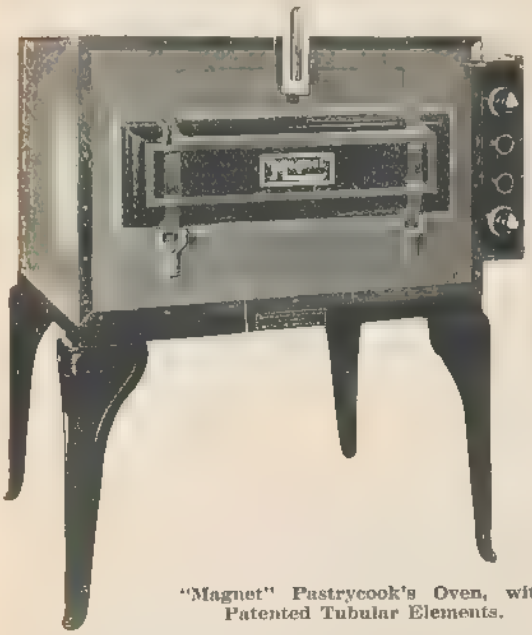
No other fuel possesses the important advantages enjoyed by electrical heating in the catering field—not only is it flexible and readily adapted to all purposes, but control is simple and heating is uniform, resulting in an unvarying product and the elimination of wastage. It cannot be over-emphasised that heat purchased in the form of electricity is delivered right to the work, and not dissipated by admixture, or lost in exhaust flues. These facts, associated with the favourable tariffs available in all important centres for electricity used commercially, explain the increasing prominence of correctly designed electric equipment in the fields of catering and industrial heating, where it has been developed to serve an infinite variety of purposes.

What to look for in Electric Equipment

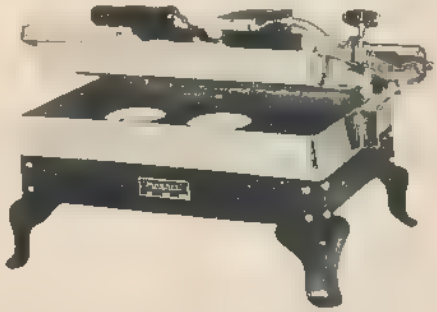
"MAGNET" appliances embody the following important features, which are of money value to every purchaser

1. Sturdy mechanical construction, protection of metal surfaces, and ease of cleaning.
2. Complete mechanical protection of electrical elements combined with ease of access for rapid inspection
3. Thorough heat insulation to conserve the current consumption by restricting heat loss to an absolute minimum.
4. Convenient location of controls, ease of operation of both controls and all moving parts.

These features are preserved in the "MAGNET" unit without sacrificing appearance, which is of increasing importance in many cases of catering layout, and the net result is low running and upkeep cost, combined with easy handling and a perfect product.

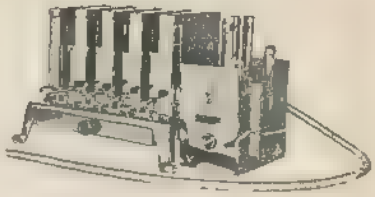


"Magnet" Pastrycook's Oven, with Patented Tubular Elements.



"Magnet" Pressure Griller

"Magnet" 4-Slice Automatic Toaster.



Magnet Equipment includes a wide selection of Ovens, Ranges, Boiling Tables, Urns and Percolators for all purposes, Bain Marie and Service Units, Boiling Water Fountains, etc., etc. Every assistance in data and layout arrangement is always available. An inspection of one of the many Magnet installations can be readily arranged.

(Continued on next page)

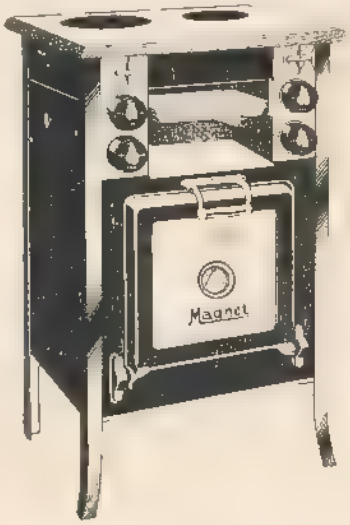
From the collections of Sydney Living Museums / Historic Houses Trust of NSW

MAGNET ELECTRIC COOKERS

Made in England for the Private Residence

"MAGNET" Cookers have been planned so that cooking is a simple, pleasant and comfortable task . . . their ovens are roomy and easily accessible at a convenient working height. The griller-toaster is in a separate unit, independent of the oven, the boiling-plates are speedy, efficient and robust. All units are separately controlled by switches, giving three stages of heat—"high," "medium," and "low" consequently there is no waste of current.

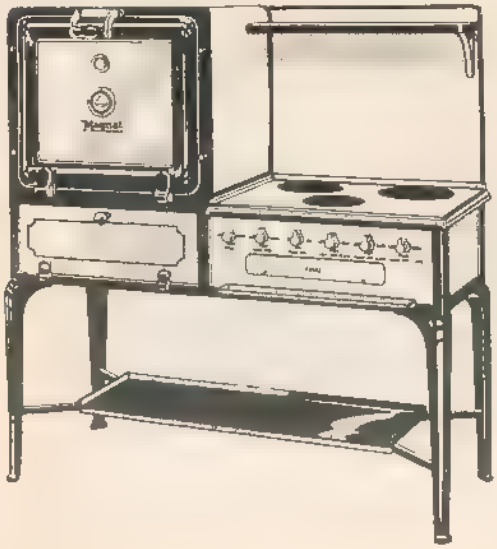
GUARANTEED FOR TWELVE MONTHS



DC 5761/L "Magnet" Pedestal Model, Black or Grey Enamel

DC 5770 "Magnet" Minor, Black or Grey Enamel

	"Magnet" Minor DC 5770/L	Pedestal Model DC 5761/L	Table Model DC 5718
Hotplates	1—7" 1200 w	1—6" 1000w, 1—8" 1600w	1—6" 1000w 1—7" 1200w 1—8" 1600w
Grills	Top Oven Element 1500w	Separate 1500w.	Separate 1500w.
Ovens Width, Depth and Height	12 x 11½ x 9in.	13 x 13 x 12in.	16 x 16 x 14in.
Loading	800w plus Grill	2100w.	2900w
Total Watts	3500w	6200w.	8200w
Terminals and amps. at 240v	1 pair in switch box 14.5 amps.	Left Pair 15.4 Right Pair 10.4 each side of cooker	Left pair 18.3 Right pair 15.8 at rear under hob
Connections AC or DC	Single Phase	1 or 3 phase	1 or 2 phase
Overall Width, Depth and Height	18¾ x 15 x 16½in.	24 x 22 x 37in.	49½ x 21 x 51in



DC 5718 "Magnet" Table Model.

All Interior Linings are vitreous enamelled, and Oven Interior parts withdrawable for easy cleaning.

All Hotplates are totally enclosed, spill-proof, speedy and efficient.

All Electrical parts and wiring completely protected, but accessible.

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

S E C RANGES

STATE ELECTRICITY COMMISSION OF VICTORIA

HEAD OFFICE: 22 WILLIAM STREET, MELBOURNE

Metropolitan Electricity Supply Showrooms
238 FLINDERS ST., MELBOURNE

DISTRICT SHOWROOMS THROUGHOUT VICTORIA

31 k

S.A.A. File No.

[For Other Products, See Index]

"MOFFAT" AUSTRALIAN-MADE ELECTRIC RANGES

Cooking by Electricity

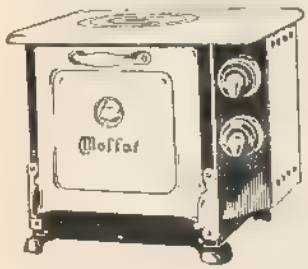
Electric cookery is different to any other method in that it is accurate and scientific, and not mere guesswork. This is the fundamental distinction, and it is the reason why the electric range is supplanting the fuel and gas stoves, just as in the last few decades the old kerosene lamp was displaced firstly by gas, which in turn gave way to electric light.

With an electric range the cooking is literally done "to a degree," i.e., the heat is indicated on the outside thermometer, and when the required temperature is reached, the switches are adjusted accordingly. There is no guessing the degree of heat, no peering into a hot oven, thereby "cooking the cook," and spoiling the food, but simply an accurate measurement and registration of a required heating intensity.

Distinctive Features

SIMPLICITY—Switches are clearly marked, easy to operate, and definite in their contact. There is no such thing as "partly on": the switch must be either on or off, whether the degree is "high," "medium," or "low."

ECONOMY—Space: No space is required for fuel bins, and even chimneys may be dispensed with in favour of a hood and flue. The saving in construction cost should pay for the range.



MODEL E 41

A compact range, especially suitable for the small family. Low in first cost, and exceedingly moderate in operating cost. Fitted with Moffat's new patented Fyroy elements. Boils on top, grills below. Porcelain enamel oven front, door, panel and hinges, high-grade black enamel finish elsewhere.

Dimensions—	Width.	Depth.	Height.
Bake Oven	12	10½	11
Top	12	14½	—
Extreme Dimensions	12	15	16½

Combination Element on Top: 1,[illegible] watts.
Bottom Oven Element: 900 watts.

LABOUR—No wood chopping or preparation of fires is necessary. Little attendance required; and there is a general saving in work due to the cleanliness of the range.

OPERATION. Costs vary in different areas, and in the Commission's districts low tariffs are available for both domestic and commercial cooking. This permits definite savings over other methods. In addition, the heat used is not dissipated, but is retained in the air-tight oven, which thus attains a high efficiency.

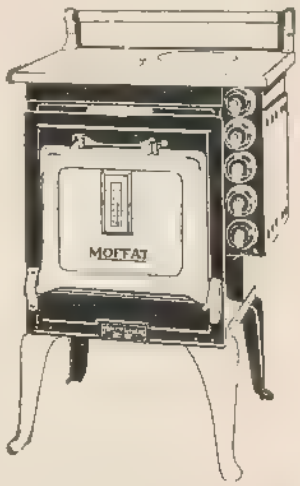
CONVENIENCE—No seeking for wood or matches, no adjusting jets or fires, and no peering into hot ovens is required. A snap of the switch operates the stove; the thermometer registers the degree of heat inside the oven; turning and basting is unnecessary, and heat losses thereby minimised.

ACCURACY—The heat is capable of exact determination and regulation, and consequently successful results can be repeated from day to day.

CLEANLINESS—There is no soot, smoke, ashes or other products of combustion to be disposed of, no burners to be cleaned, and the interior decorations of the kitchen, etc., remain in a clean condition. The enamel finish makes cleaning of any spill-overs easy and effective.

RELIABILITY—Electric cooking apparatus is designed for lifetime service, and its maintenance cost is low. Parts are easily replaceable.

SAFETY—Fire and explosion and gas poisoning risks are banished. Electric ranges are thoroughly safe to use, and in this respect surpass any other cooking stove.



MODEL E.28

An excellent range for the small apartment, or where the cooking demand is for three or four persons. White and ivory enamel oven front, top, door panel, hinges and front legs.

Dimensions.	Width.	Depth.	Height.
Oven	14	13½	12
Top	23½	16½	—
Floor to Top	—	—	36
Extreme Dimensions	23½	19½	45

Elements on Top: One 1,700, one 990 watts.
Elements in Oven: Two 1,000 watts each.

COMFORT. Almost all the available heat is used in the cooking operation, and a minimum amount only dissipated in the room; consequently the operation is cool and comfortable.

BEAUTY—Handsome in design and beautifully finished in enamel, an electric range is an attractive addition to any kitchen.

Other Models and Accessories

In addition to the models shown in this catalogue, the following are available:—

E42—Similar to E43, but smaller. Two hot-plates.
E37—Similar to E28, but larger. Three hot-plates.
E38—Largest low-oven type. Four hot-plates.
E36—Largest cabinet type. Four hot-plates.

(Continued on next page)

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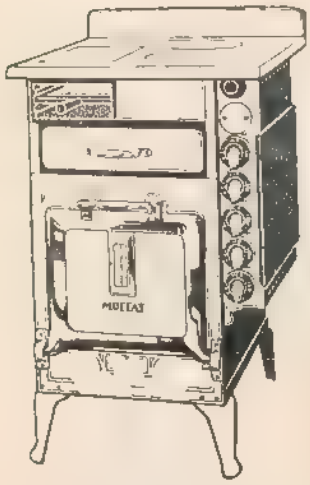


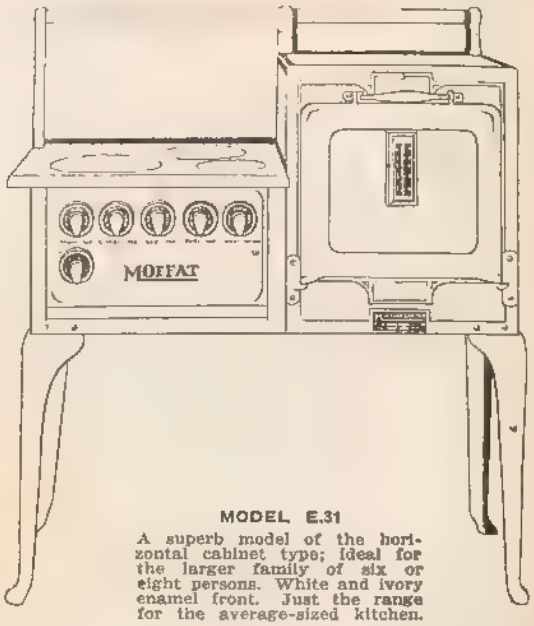
MODEL E.43

A superb range with a high-quality finish. The outside grill is the outstanding feature. Pancakes and scones can be baked on top while grilling is being done below. The model is equipped with dish-warming compartment. White and ivory enamel finish to front and top; sides finished high-grade black enamel

Dimensions—	Width.	Depth.	Height.
Bake Oven	14	18	12
Grill Oven	8	11½	3¾
Dish-Warming Drawer	15¾	20	4½
Top	24	22½	—
Top to Floor	—	—	36¾
Extreme Dimensions	24	25½	39¾

Elements on Top: One 1,700 watts, one 660 watts; one grill element, 1,260 watts.

Elements in Oven: Two 1,260 watts each.



MODEL E.31

A superb model of the horizontal cabinet type; ideal for the larger family of six or eight persons. White and ivory enamel front. Just the range for the average-sized kitchen.

Dimensions—	Width.	Depth.	Height.
Bake Oven	14	18	12
Top	21	22½	—
From Floor to Top	—	—	33
Extreme Dimensions	39	25¾	45¾

Elements on Top: One 1,700, one 990 and one 660 watts.

Elements in Oven: Top, 1,500 watts; Bottom, 1,260 watts.

The following accessories and refinements are also available:—

- High backs for all low-oven types.
- Legs and stand for E41 types.
- Floor trays—all models.
- Power points suitable for connection of jugs, kettles, and other appliances are fitted to all models excepting E41.
- Coloured mottled enamel effects.

Prices

Having entered into a large contract with the manufacturers, the Commission is able to market the range at a low rate. Current prices range from £10/15/- upwards. Liberal hire-purchase terms, extending over a number of years, are available to consumers.

Installation

The E41 model may be plugged into a 15-amp. power-point, but larger models require special wiring.

Servicing

Ranges sold by the Commission are guaranteed twelve months against electrical failure, and after that are subject to a service policy covering replacement of any necessary spare part at the cost of such part only —labour being provided free

Australian-Made

The State Electricity Commission of Victoria holds a licence from Moffats Ltd., Canada, the largest manufacturers of electric ranges in the British Empire, for the manufacture of "Moffat" ranges in Victoria, and has arranged accordingly with Metters K.F.B. Pty. Ltd., Melbourne These ranges are now available at the Commission's showrooms and leading hardware and electrical houses in Melbourne

Apartment House Installations

Although no special models are made for flats and apartment homes, there is no great difficulty in adapting existing models for such purpose. For instance, the legs are detachable and structure of the stove is such that readily permits its being built-in to any desired position

Installation Data

The total connected wattage of the various types, excluding plug connection, is as follows:—

Model No.	Total Connected Watts	Total Current (amps.) at 230 volts	Total Current (amps.) at 200 volts
E 28	4690	21	24
E 31	6110	27	31
E 36	7280	32	37
E 38	7610	33	38
E 42	5055	22	25
E 43	6140	27	31

(Continued on next page)

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COMMERCIAL ELECTRIC COOKING

General

The advantages of cooking by electricity over other methods in the way of simplicity, economy, convenience, accuracy, cleanliness, serviceability, safety, comfort, etc., are fully set out on page 463 (domestic ranges). Brief mention may here be made, however, to two further points:—

(a) The ability to maintain throughout any cooking and baking operation a definite heat by automatic thermostat control.

(b) The absence of products of combustion and heated fumes. A simple ventilation system to remove cooking steam, etc., is all that is required, thus giving greater freedom in the location of the kitchen.

Application

The field for commercial electric cooking consists of hotels, restaurants, hospitals, institutions, clubs, boarding schools, bakeries, etc. Examples in Melbourne are Buckley & Nunn Ltd., Myer Emporium Ltd., Georges Pty. Ltd., Royal Automobile Club, Scotch College, Church of England Girls' Grammar School, South Yarra, the "Argus" office, the Commonwealth Bank, etc.

Equipment Available

A wide range of equipment in various sizes is available, including toasters, griddles, waffle irons, egg boilers, plate warmers, food warmers, urns, pastry ovens, pie ovens, roasting ovens, heavy duty cooking ranges, cooking tops, broilers, fish fryers, stock pots, steam tables, bain's marie, baking ovens, etc. It can be seen from the above that electric equipment is available for every kind of cooking operation. Each installation, however, requires separate consideration to determine which items, and what size equipment, should be used.

Kitchen Layout

The plan of the all-electric kitchen at Yallourn Hotel is set out on this page as being indicative of what a modern hotel kitchen should be. Full particulars of the equipment in this and other hotel installations are available from the Electricity Sales Branch of the State Electricity Commission.

Service to Architects

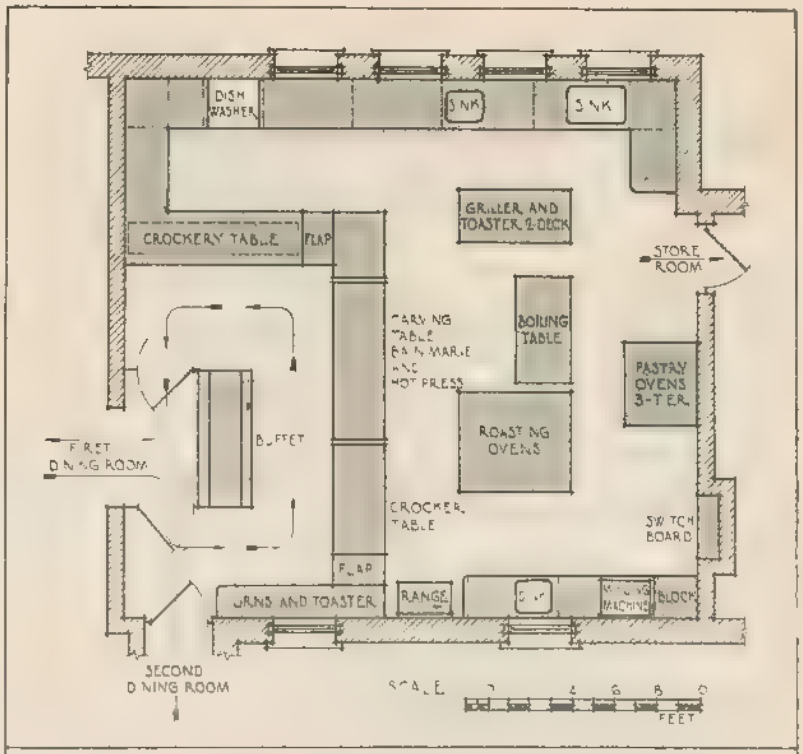
The Commission's technical staff are available at all times in an advisory capacity, and Architects are invited to freely avail themselves of this service.

Costs

The remarkable flexibility of the Electric Range in coping with sudden peak rushes enables material savings to be made both in operation and food costs. The electricity consumption per person per meal varies with the kind and variety of food to be served and the electricity rates available. Generally it ranges from 0.25 units in the case of institutions and schools where a definite menu is prepared for all persons, up to 1.0 units for restaurants, where a variety of different orders are required quickly. For cafeterias, clubs and hotels, the figure would range from 0.35 to 0.75 units per person per meal, depending on conditions. In estimating electricity consumption, therefore, each case must be considered on its merits. The above figures show that, with the tariffs for electricity prevailing in Melbourne, costs as low as 0.5d. to 0.75d per person per meal can be achieved in many cases.

For bread baking approximately 9 units are required per 100 lbs. bread. Rates for electricity vary, but most districts have a low restricted hour rate which permits the use of current between 11 p.m. and 7 a.m. at specially reduced rates. A most important factor in favour of the electric bake oven is the saving in dough, which is usually in the neighbourhood of 6d. per bag of flour.

On the side of capital expenditure, sight should not be lost of the saving in ground space which is possible in the case of an electrical installation.



LAYOUT OF ELECTRIC KITCHEN — YALLOURN HOTEL

(Continued on next page)

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LAUNDRY APPLIANCES

Labour Saving Laundry Equipment

The major labour-saving electrical appliances for laundry use consist of washers, hydro-extractors, drying cabinets or rooms, ironers and presses.

Washers and Hydro-Extractors

Washers are built in all sizes, from domestic machines with a capacity of 15 shirts per batch to large commercial machines capable of handling 350 shirts per batch. All washers can handle all classes of goods from silk stockings and fancywork to sheets and blankets without damage to the goods The machines carry out efficiently the breaking down, washing, rinsing and blueing operations.

Some types of domestic washing machines have a motor-driven wringer, while in others the water is removed from the clothes by centrifugal action, either in the washing basket itself, or in a separate extractor integral with the machine In commercial installations a separately mounted centrifugal type extractor is invariably used

Drying Cabinets and Rooms

Clothes drying in private houses and small commercial establishments can be taken care of by drying cabinets For large commercial premises and laundries, special drying rooms or compartments, with forced ventilation where necessary, can be provided. Automatic temperature control can be provided where desired. The great advantage of drying cabinets and rooms is the independence of weather conditions, thus ensuring delivery of goods on time

Ironers

Ironing machines are available to cater for any ironing operation, whether flat work, such as sheets and table cloths, general work, such as soft shirts and frocks or special work, such as evening shirts and stiff collars. Ironers range from small domestic sizes to large commercial machines with multiple rolls The ironers are both electrically driven and heated

Domestic Installations

A domestic laundry to be complete would require a washing machine, ironing machine, and hand iron, and also, if independence of weather conditions were desired a drying cabinet

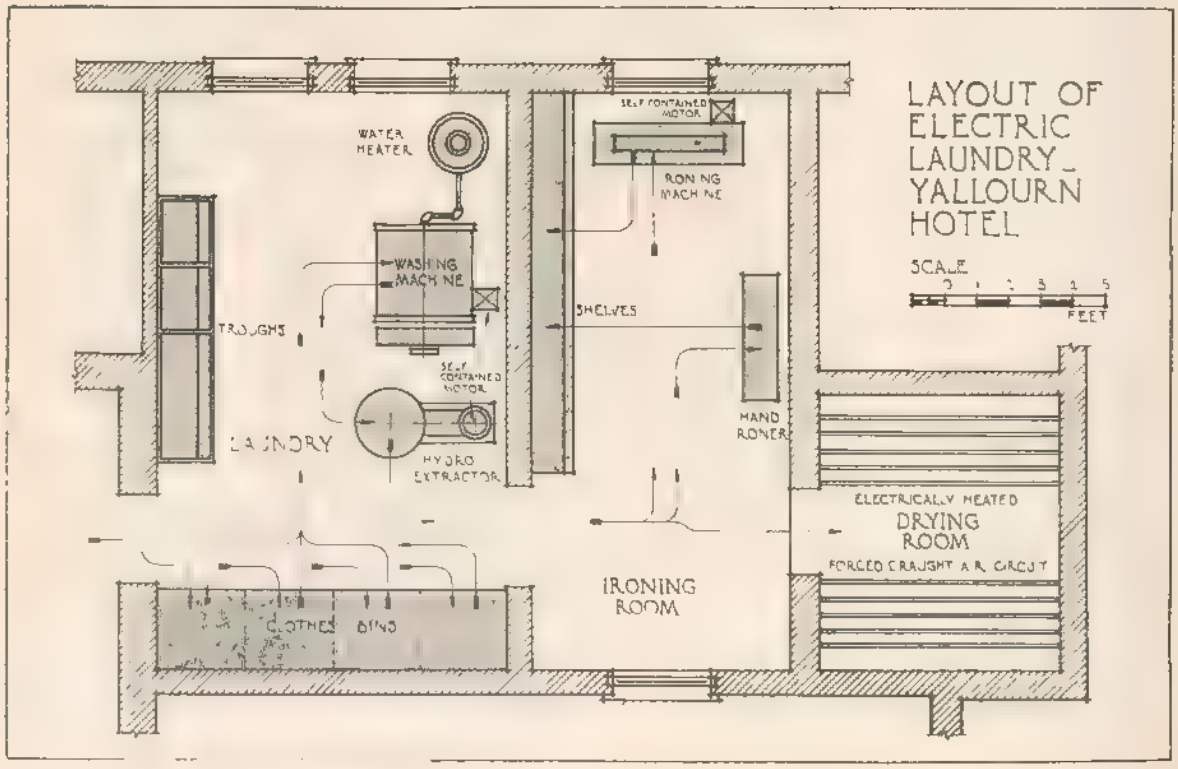
Commercial Installations

A washing machine, hydro-extractor, drying room, ironing machine and hand iron would be required for a commercial installation. A great advantage of electrical equipment is that the driving motors are integral with the machines, thereby avoiding countershafts and belts

Wiring Notes

The main points to ensure regarding wiring and equipment are:—

1. That three or four pin power points are used.
2. That heating elements are provided with thermostats to automatically switch them off when a safe temperature is attained, and with pilot lamps to indicate when they are switched on



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SECTION S

[Containing S.A.A. Filing Section No. 32]

REFRIGERATION

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32c
S.A.A. File No.

Carrier Australasia Ltd.

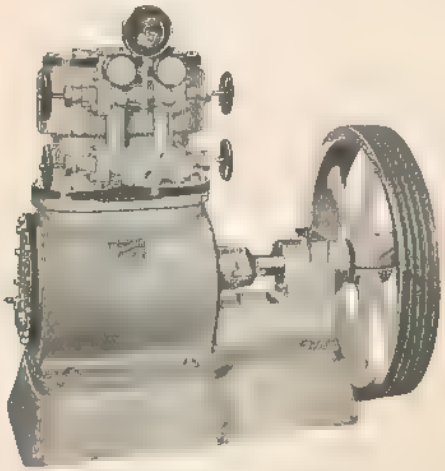
"MANUFACTURED WEATHER"
Makes Every Day a Good Day

FOR OTHER PRODUCTS SEE INDEX

56 HUNTER STREET, SYDNEY
Telephone: B1512, BW5265

531 LIT. COLLINS ST., MELBOURNE
Telephone: F4926

A presentation of the most complete line of Commercial Refrigerating Apparatus that the Industry has to offer



Brunswick Belt Driven Ammonia Compressor

For more than a third of a century Carrier and its subsidiaries have been making, in every part of the world, thousands of installations for commercial, industrial and marine use.

One of the reasons for this world-wide acceptance is the high quality of Carrier Equipment. Another reason—almost as important—is the fact that our interest in an installation is not limited to the sale.

The consolidation of the former Brunswick-Kroeschell Company with the Carrier Engineering Corporation has increased our facilities for research and engineering development.

Your refrigerating problem, whatever it may be, receives the benefit of the broad viewpoint represented by the combined organisations, which may confidently be expected to reflect the most advanced and practical means of giving you the results you want in the most economical manner. The working arrangement in effect between Carrier Corporation and the Worthington Pump and Machinery Corporation also represents another important step, which enables Carrier to offer both a complete line of refrigerating equipment and a complete refrigeration service.

Our staff of engineers is ready at all times to prepare expert and unbiased recommendations to meet any particular need efficiently and economically. Then, to make doubly sure that the best possible results are obtained, we make every effort to keep in close touch with an operator after his plant is once installed.

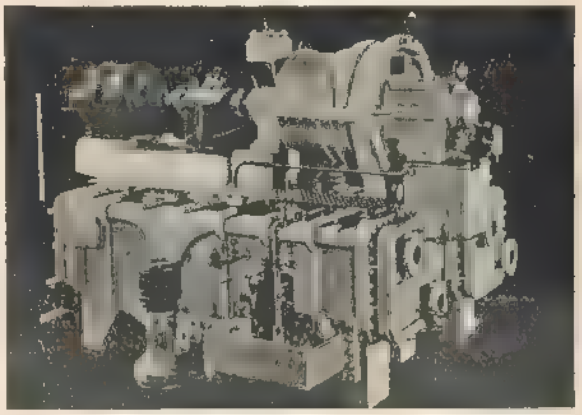
It is this high quality of both equipment and service which assures you permanent satisfaction.

"CARRIER" CENTRIFUGAL SYSTEM

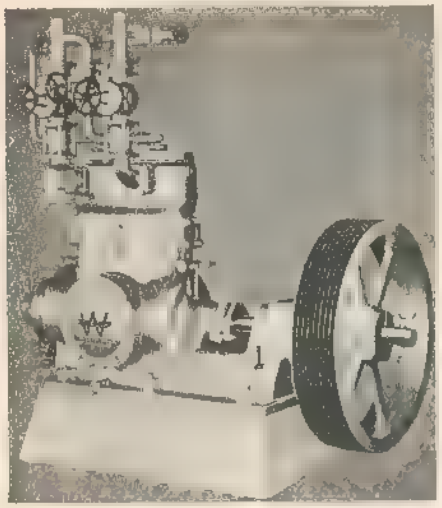
Refrigerant—Carrene (CH_2Cl_2).

This system marks a new era in the history of mechanical refrigeration. Eminently successful in initial designs, these units now have a background of more than ten years' refinement. Hundreds of installations are operating in conjunction with Air Conditioning equipment, and in many special cases where quick, accurately-controlled liquid cooling is required.

Examples: Water-cooling for chemical processes, freezing ice on skating rinks, liquid-cooling in beverage plants.



Typical Carrier Centrifugal Refrigerator Unit, complete with Compressor, Evaporator, and Condenser



Carrier-Worthington Vertical Compressor

The compressor is a true centrifugal unit identical in principle to familiar centrifugal pumps or blowers. The only contacts of moving parts are the two main shaft bearings. There are no valves and no packings. The compressor is operated by direct connected steam turbine or motor driven through gears.

Evaporator, condenser and compressor are assembled as a unit in all sizes. There is no extraneous refrigerant piping or fittings.

The refrigerant—Carrene (CH_2Cl_2)—is a stable liquid at all normal atmospheric temperatures and pressures. It is non-corrosive and non-inflammable. The entire cycle of operation, high and low side, is at vacuum with relation to atmosphere.

Control is entirely automatic—the most widely and frequently varying load is carried with maximum efficiency without requiring personal attention. This, together with the fact that maintenance is extremely low, makes possible considerable operating economies.

Carrier Centrifugal Refrigeration is available in standard sizes ranging from 10 to 350 tons.

Carrier
WEATHERMAKERS TO THE WORLD

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W

WERNER ELECTRIC

MADE IN AUSTRALIA

R. WERNER & CO. PTY. LTD.

ENGINEERS

54-84 BURNLEY STREET, RICHMOND, VICTORIA
Tel. J 1161, J 1087

SALESROOM: 602 LT. COLLINS ST., MELBOURNE. Cent. 4320

Interstate Agents:

NEW SOUTH WALES:
Messrs. Stuart Walker & Co. Ltd., 174 Clarence Street, Sydney.
Mr. R. J. Lindsay, 99 Kippax Street, Sydney.

SOUTH AUSTRALIA:
The Implement Co., Bank Street, Adelaide.

WEST AUSTRALIA:
Mr. W. G. Davies, Cambray Chambers, St. George's Terrace, Perth.

QUEENSLAND:
The Engineering Supply Co. of Aust. Ltd., Edward & Charlotte Streets, Brisbane.

32c

S.A.A. File No.

WERNER ELECTRIC REFRIGERATION

Werner Products

Ammonia Compressors in Enclosed and Horizontal types from 4 to 250 tons daily Refrigerating Capacity.

Werner Electric Refrigerators in 1/6th H.P. to 2 H.P. capacity.

All Butter Factory Equipment, including Batch and Flash Pasteurisers, Cream Pumps, Cream Savers, Cream Coolers and Fittings. Also Brine and Ice Tanks, all Classes of Coils, Insulation of Cool Chambers, Corkboard and Cool Chamber Doors and Fittings. Anything for refrigeration or the Butter Factory.

Commercial Refrigeration

The Werner line of Refrigerating Plants may be applied to any form of "cold production," whether for plain food storage, liquid cooling, ice making, air conditioning or any service for which a lower temperature than the surrounding atmosphere is required.

ALTOMATIC CONTROL AND REFRIGERATOR SAFEGUARDS.—The Werner Electric Refrigerator is started and stopped by pressure switch, or thermostat, as may be most suitable for the particular installation. In addition, the motor is protected from overload beyond the safe limit by an electric cut-out device.

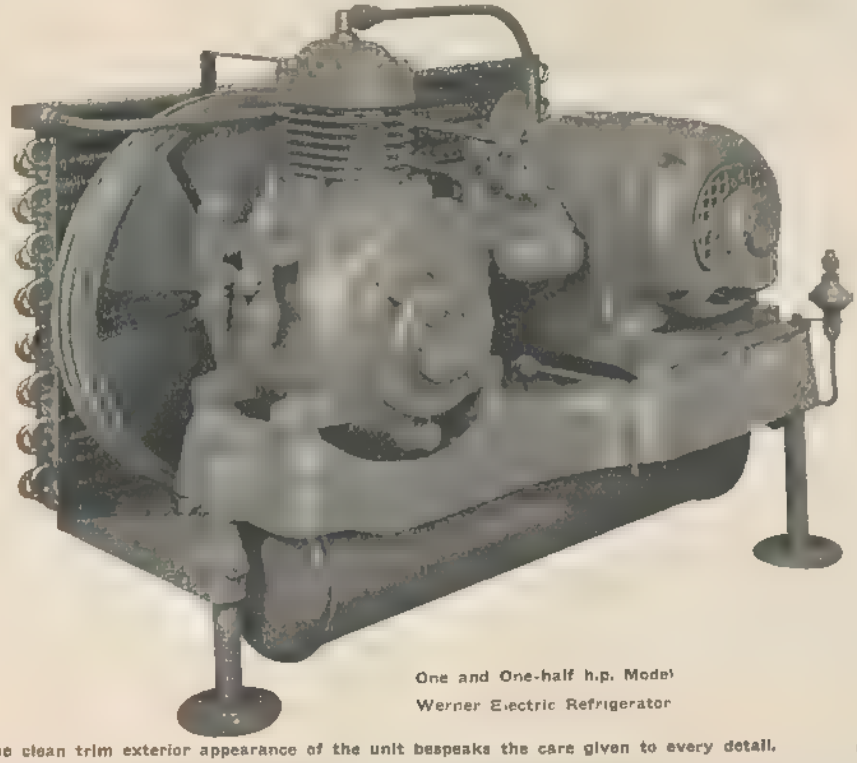
THE COMPRESSOR.—All Werner Electric Compressors are fitted with silent valves and run in a deep oil bath.

THE MOTOR. Motor of ample power and exact voltage requirements provide the Werner Electric Refrigerator with a reliable source of silent power. Single phase motors of Australian manufacture.

EVAPORATOR OR COOLING UNIT. Flooded or direct expansion type of plain or finned coils to suit application. Ice making and salad draws for small cabinets. All cooling surfaces adequate to provide ample cooling and minimum dehydration.

THE AIR-COOLED CONDENSER.—Radiator type condenser, cooled by a fan on the motor shaft. This type of condenser with fan, has ample capacity and is the perfection of efficiency. No water is required with this type, but water-cooled condensers are available for special installation.

THE REFRIGERANT. Methyl Chloride is the coldest and safest refrigerant practical for electric refrigeration. Its operating cost is low. It has no obnoxious or suffocating odours, and is non-corrosive and is the least toxic of refrigerants available for commercial service.



One and One-half h.p. Model
Werner Electric Refrigerator

The clean trim exterior appearance of the unit bespeaks the care given to every detail.

(Continued on next page)

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THE "WERNER" FINNED COIL WITH THERMAL EXPANSION VALVE CONTROL.—This system of providing refrigeration or cooling for cool chambers, etc. is the very latest development in electric refrigeration, and some of the world's leading manufacturers have forsaken the use of the flooded type of finned coil in its favour.

Perhaps some of the most assuring points for the buyer are that each chamber is provided with a coil in exact proportion to its needs as Werner Finned Coils are all made to provide the same amount of cooling area as the **outside** of the walls, doors and ceiling of the cool chamber.

Each Werner Finned Coil has a cooling surface [illegible] 1 per cent. of the outside area of the chamber.

Other types of flooded finned coils work on 30 per cent. to [illegible] per cent. only. While it is frankly admitted that the flooded type have colder surfaces and consequently do more work per sq. foot, the fact that our coil has four to five times the cooling area more than compensates for this.

From a technical standpoint the advantage gained from the Werner Finned Coil is chiefly in the higher back pressure at which the refrigerant gas will return to the compressor, rendering the compressor capable of doing more work in the same time, or the same work in less time than with the older type of coil.

The big advantage, however, from a user's point of view is in the correctness of humidity obtained in the cool chamber, as on account of the large cooling area it is not necessary to reduce the temperature of the cooling fins to so low a degree that they frost to any extent. This means that practically no frost is formed, and the humidity is not brought down so low that the food contents of the chamber begin to give up their moisture to an over dry air and so lose valuable weight and appearance.

The Werner Finned Coil operates on the principle of exposing a large area of moderately cold surface, as against the older types which rely on a comparatively small area of very cold surface. In operation, our finned coil merely becomes coated with moisture at about 35 degs., and this moisture is constantly tripping off the coil and getting away down the drain. Under these conditions, as there is no frosting and defrosting, the humidity is correct and constant. Not low when the frost is on the coils and high when the compressor stops and the frost drips off.

Shut down periods for defrosting as per instructions with some units, are not necessary with our system, and consequently those long running periods when ice forms on the fins, is avoided, keeping running costs to a minimum.

Other advantages are that our coil covers almost the entire length of the chamber over which the air circulates, so that the temperature of air falling from the coil on the down draft side of the chamber is always even in temperature and volume.

Other makes that do not cover the space so well are prone to deliver more and colder air in the centre of the room.

Another point is that our fins run parallel with the air flow.

Capacities and Sizes of Units

Werner Electric Units are made in 8 sizes, namely, 1/6th, ¼, 1/3rd, ½, ¾, 1, 1½, and 2 H.P. It is not very practical to give cubic feet capacities for units offhand, as type and density of insulation, external and internal temperatures and the product to be cooled, all have to be taken into consideration. These points have to be carefully weighed, so it calls for an expert opinion.

Werner & Co. Pty. Ltd. have a staff of electric refrigeration experts, who are available to visit any job and give advice.

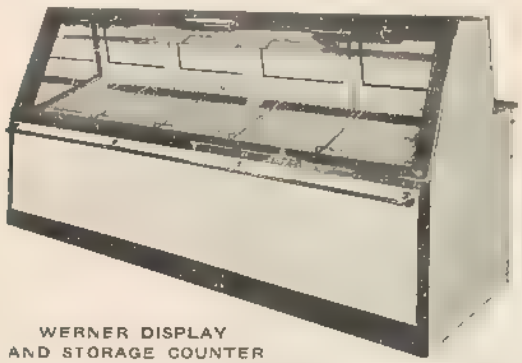
There is a Werner Electric Unit for every job.

Installation

The Werner Electric Units are installed and serviced by skilled mechanics. All connecting pipes are run plumb and level, well stayed from vibration and neatly bent as required.

"Werner" Refrigerated Counter and Cabinets

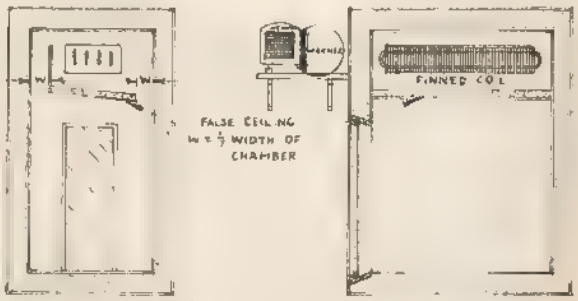
R. Werner & Co. Pty. Ltd. offers a variety of standard and special cabinets and counters from nine cubic feet upwards. Prices on application.



WERNER DISPLAY AND STORAGE COUNTER

CONSTRUCTION AND INSULATION.—All construction is the best possible in its class, great care being taken to obtain an air-tight and robust job. Insulation of corkboard in thickness to suit application. All properly sealed with hot bitumen.

COOLING COILS.—Werner Display Counters are fitted with special top section cooling coils, in addition to the usual bunker coil at back. This feature eliminates that warm upper section common to the usual type of display counter and enables full advantage to be taken of the upper shelf.



WERNER ELECTRIC INSTALLATION

FINISHES.—Internal: Porcelain Enamel, Monel Metal, Tinned Copper, Galvanized Iron or Painted Wood. External, White or Coloured Lacquer over Iron. Polished Wood or Painted Wood.

EQUIPMENT.—All cabinets and counters are equipped with best quality nickel or chromium plated hinges and catches, and all doors close on to single or double Wirfs. Air tite Gaskets.

Locks can be fitted at extra cost if required.

Ice-cube making drawers provided with small cabinets when required.

Large Refrigerating Installations

In large institutions the demand for cold storage service exceeds that which can be economically supplied by the Werner Electric Units; we offer the larger commercial ammonia plants operating on automatic control, brine storage, or brine circulating system.

Cool Chamber Doors and Insulation

R. Werner & Co. Pty. Ltd. specialise in the supply erection and finishing of corkboard and other insulation. Also the latest type Cool Chamber Doors and fittings in duco or plated finishes.

Household or Domestic Cabinets

The Werner line of refrigerators is completed by the inclusion of 5 sizes of exceptionally well-designed household cabinets, 4.5 and 5.5 cub. ft. net storage capacity being the two smallest. Each of the smallest cabinets has two ice-making drawers holding 56 small cubes, making a total of 4 lbs. The larger cabinets have cube makers to suit individual requirements. Inside finish is in white porcelain enamel and outside in white or coloured lacquer with chromium plated hardware. The cooling unit itself is also porcelain enamelled, a feature only equalled in expensive imported models. In common with other "Werner" refrigerators these units are air cooled and silent in operation, and are thermostatically controlled. The refrigerant is Methyl Chloride, and the entire charge of gas can be liberated into an ordinary living-room without injurious effect to the occupants.

Engineering Service to Architects

Almost every refrigerating layout calls for different treatment and our designing staff is always available to advise in the matter of insulation, position of machinery, etc.

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

THE ASSOCIATED GENERAL ELECTRIC INDUSTRIES LTD.

N.S.W.—The Associated General Electric Industries Ltd., 95 Clarence Street, Sydney, and at Keen Street, Lismore; 53 King Street, Newcastle.

VICTORIA—The Associated General Electric Industries Ltd., 108 Queen Street, Melbourne.

S.A.—The Associated General Electric Industries Ltd., 25 Grenfell Street, Adelaide.

QUEENSLAND — The Associated General Electric Industries Ltd., Kelvin House, Adelaide Street, Brisbane; and at 158 East Street, Rockhampton, Flinders Street East, Townsville.

W.A.—Agents:—Messrs. Atkins (W.A.) Ltd., 894 Hay Street, Perth.

TASMANIA — Agents:—Messrs. Oliver and Oliver Pty. Ltd., 9 Argyle Street, Hobart, and at Quadrant, Launceston.

32c

S.A.A.I.E. No.

[For Other Products, See Index]

Product

General Electric All-steel Refrigerator—for homes, apartments, clubs, restaurants, shops, institutions and hospitals.

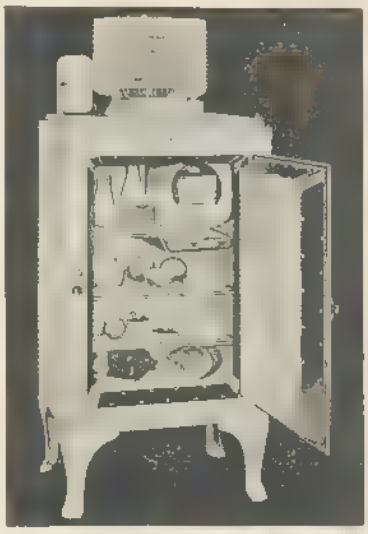
Design

Designed to (1) occupy little space, (2) eliminate exposed moving parts, (3) require no attention, not even oiling, (4) eliminate servicing to a minimum, (5) provide constant refrigerating temperatures automatically and at low cost, (6) reduce the possibility of gas leaks, and other causes of failure to a minimum.

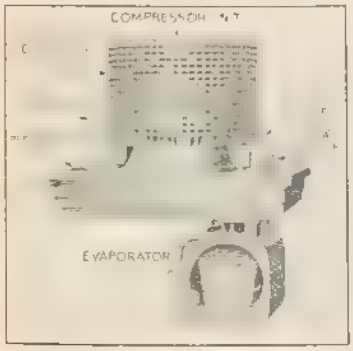
General Advantages

In specifying G.E. All-steel Refrigerators, the architect has the assurance that he is specifying an electrical product that will give outstanding, continuous satisfaction. He eliminates the need for any unnecessary work, for no plumbing or extra wiring is required.

The icing unit is one of the simplest yet devised, the compactness of the evaporator gives more room for actual food storage.



Model G55—6½ c.ft. Capacity



Operation of the G.E. Icing Unit

For the purpose of explanation, the General Electric Icing Unit can be divided into four major parts.

(1) **The Freezing Chamber.**

Sometimes called the evaporator or chilling unit. This is inside the cabinet.

(2) **The Compressor.**

Which is inside of the hermetically sealed casing, and that compresses the gas after it evaporates.

(3) **The Condensing Coils.**

After the Refrigerant vaporises in the freezing chamber, it is compressed and passed into the condensing coils where it is cooled and turned to liquid form ready to commence another cycle.

(4) **The Control.**

It automatically regulates the operation of the machine and is so perfected that it provides an even temperature inside the cabinet.

The range in temperature in the evaporator is from 14 degrees to about 28 degrees F.

The above system of generating cold is probably the simplest and most trouble-free that has been invented for the home.

Refrigerator Mechanism Guaranteed for Four Years.

Table (Capacities—Dimensions)

Model	Food Storage Capacity	Food Shelf Area	Floor Space Required	Height	Motor H.P.
[illegible]	[illegible]	[illegible]	[illegible]	5ft. 6¼in.	1/8 H.P.
[illegible]	[illegible]	[illegible]	34 5/16in. x 25 13/16in.	5ft. 7¾in.	1/8 H.P.
[illegible]	[illegible]	[illegible]	11¾in. x 25in.	5ft. 8¾in.	1/6 H.P.
G 100	10.7 cu. [illegible]	[illegible]	44 11/16in. x 33 9/16in.	5ft. 5in.	1/6 H.P.
PL 13	13.6 cu. [illegible]	[illegible]	18in. x 24¾in.	5ft. 11in.	1/6 H.P.
PL 17	[illegible]	[illegible]	61¾in. x 24¾in.	5ft. 11in.	1/6 H.P.

The whole unit can be simply raised out of the cabinet and replaced with a new one in the event of an emergency.

There is no exposed machinery—it is all contained in an hermetically sealed steel casing mounted on the top, up and away from floor dirt. The circulation of air through the coils prevents dust from settling on the top.

The corners of the interior of the cabinets are rounded to make cleaning an easy task. All of the models are mounted on legs to permit cleaning of the floor underneath. The General Electric All-steel Refrigerator operates so quietly that it can hardly be heard, and the cold loss has been reduced to the minimum. It is guaranteed against defective materials and workmanship for four years.

Other Models

Large models up to 60 cub. ft. capacity are available where food can be kept in quantity.

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

32c S.A.A. File No	BRITISH GENERAL ELECTRIC CO. LTD. HEAD OFFICE FOR AUSTRALIA—SYDNEY BRANCHES AND SOLE AGENTS: MELBOURNE, NEWCASTLE, BRISBANE, PERTH, ADELAIDE, HOBART, WELLINGTON, AUCKLAND, CHRISTCHURCH, N.Z., SUVA, LEVUKA, FIJI	B. G. E.

GENALEX REFRIGERATORS

Domestic

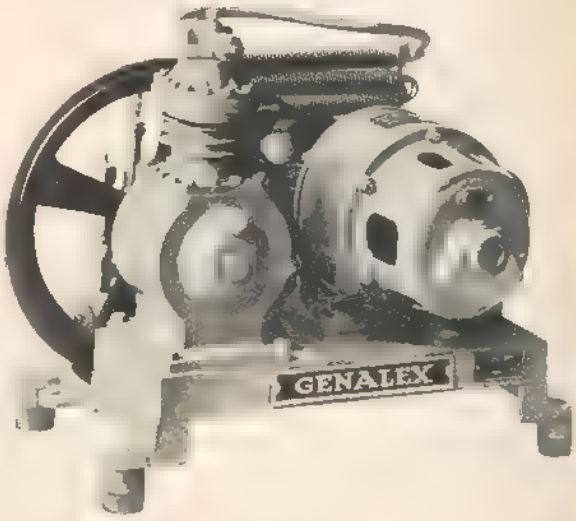
The Genalex Range of Domestic Refrigerators embraces capacities from 4 cubic feet to 14½ cubic feet, thus catering for the requirements of families of all sizes

The Refrigerant used is Sulphur Dioxide (SO2), which has many features to commend it The gas is colourless and has a pungent irritating odour. It has a boiling point of 14 degs. F. at atmospheric pressure, is non-poisonous, non-inflammable, and does not support combustion It has no corrosive effect on copper, copper alloys, or iron. Leaks may be easily located by a smoke test, using ammonia water applied with a brush. In presence of a leak a chemical action occurs, forming a dense white smoke The gas is very stable and will easily withstand the temperature conditions encountered in normal operation. The critical pressure is 1,141.5 lb. per sq. in. absolute. One volume of water dissolves 80 volumes of this gas at 32 degs. F. and 47 3 volumes at 60 degs. F It requires about 2 6 times the displacement of an ammonia machine for the same amount of refrigeration. Sulphur dioxide assists lubrication because it is stable under working conditions and inert on lubricants and gaskets

Compressor Unit

The Compressor Unit comprises a slow speed Twin cylinder Compressor, belt driven by a suitable alternating or Direct Current Motor

The advantage of a twin cylinder Compressor is that it is naturally balanced and thus eliminates the vibration which is prevalent with a single Cylinder Compressor



Genalex Compressor Unit

Genalex Domestic Refrigerator

Automatic Cold Control

This feature enables users to set their own standard and ensures economy in operation. As soon as the required degree of cold is reached the motor automatically cuts out, and cuts in again with any rise in temperature thus automatically maintaining a correct temperature

Cabinets

The cabinets of Genalex Refrigerators are designed and finished on hygienic lines as the makers have fully realised the importance of this feature in the preservation of foodstuffs The location of the baffle ensures a correct and ample current of air to circulate inside the cabinet

Commercial

Genalex Commercial Units comprise a full range suitable for Hotels, Dairies, Butchers, Hospitals, and a variety of Display Counters for perishable foodstuffs, etc

If you have any refrigeration installations do not hesitate to consult us—we are always ready to place the services of our experts at your disposal on all your Refrigeration problems

Dimensions of Household Units

Model	Gross	Shelf Area Sq. Ft.	Overall Dimensions			Number of Ice Trays
			Width	Depth	Height	
G4	[illegible]	5	23¾ in.	21¼ in.	57 in.	2
G45	4½ cu ft	5 6	24 in	22¼ in.	56 in.	2
G65	6½ cu ft	9 4	27 in.	24¾ in.	63¼ in.	3
G85	8½ cu ft	11 [illegible]	[illegible] in	26¼ in	[illegible] in	[illegible]
G145	14½ cu ft	15 7	39 in	28 in	68 in	4

Each Ice Tray holds 12-1¼ inch Cubes.

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

S E C Refrigerators	STATE ELECTRICITY COMMISSION OF VICTORIA HEAD OFFICE: 22 WILLIAM STREET, MELBOURNE Metropolitan Electricity Supply Showrooms: 238 FLINDERS ST, MELBOURNE DISTRICT SHOWROOMS THROUGHOUT VICTORIA	32c S.A.A File No.

[For Other Products, See Index]

"ELECTRICE" (ELECTRICAL) REFRIGERATION

Installation and Servicing

Installation of domestic models can be effected to any suitably placed and earthed power point. Commercial models require special installation, and in all cases the work is supervised by the refrigeration engineers on the Commission's technical staff.

ELECTRICE refrigerators are covered by a guarantee against defective parts or workmanship for a period of three years.

Depreciation on an ELECTRICE machine is almost negligible and the design of the plant provides for the replacement of any part with a minimum of disorganisation and expense This provision does not mean the replacement of the whole component, but only that part which is actually worn.

A very important consideration is that the works are situated in Australia, and therefore duplicate parts can be obtained at the end of the telephone, so to speak, and not at the other end of the world.

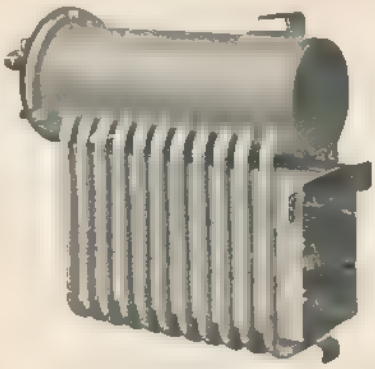
Operation

ELECTRICE refrigeration is simple and accessible in design, comparatively silent in operation and has been built to endure. An important feature is the automatic operation, whereby the required temperature is controlled. Immediately the cabinet temperature rises, the motor is automatically switched on, thus causing the process of refrigeration to come into action, when the necessary fall in temperature has been effected, the motor is automatically stopped, thus preventing any waste of power. In addition to the automatic operation, each machine has, as standard equipment, the extra control called the temperature or cold control. This is of special design and enables the user to speedily adjust the temperature settings

Cooling Units

All ELECTRICE cooling units, or coils, are constructed entirely of copper, this being the best available metal, combining non-corrosive qualities with a high ratio of conductivity

The "flooded system" is used throughout, as this is the most efficient method for heat absorption, and allows the use of an automatic pressure control, which is the most accurate form of control in existence.



Type ET65—Cooling Unit.

A full range of coils is manufactured, including domestic (with ice-making facilities), liquid cooling coils and the latest designed cross-fin coil for commercial work. The cross-fin coil is the biggest advance yet made in commercial coils.

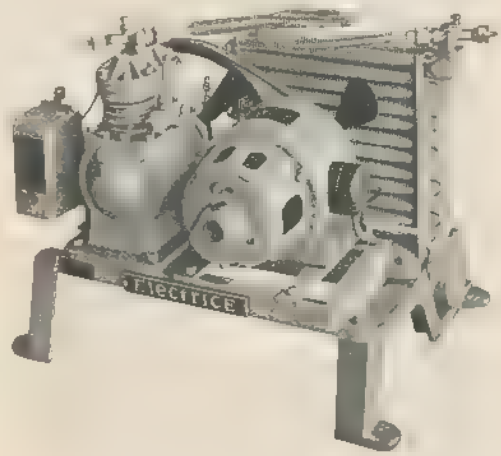
Compressor Units

Compressor units are simple and compact in design and great care has been taken in the selection of materials to ensure dependable operation and long life.

Compressors range from the small domestic model operated by a 1-6 h.p motor to the large commercial unit driven by a 3 h.p. motor.

Each compressor is a precision engineering product, and is of the reciprocating type

Efficiency is enhanced by the use of large finned copper condensers, which have a much greater "surface" than those on imported machines, thus resulting in lower operation and maintenance costs. A further improvement is the adoption of a finned discharge line



Type DE—Electrice Compressor Unit.

Made in Australia

ELECTRICE refrigeration units are an Australian product being manufactured by the Emmco Works in Sydney. The motors, which are specially designed for refrigeration work, are also made at the Emmco Works. In addition to servicing advantages due to facility in obtaining any duplicate parts, is the fact that the machine has been specially constructed for local climatic conditions

Multiple Installations

A multiple installation consists of two or more cabinets operated from one unit.

ELECTRICE is particularly adaptable to this form of installation, the main consideration, from the buyer's view point, being a saving in initial cost.

Blocks of flats, or a combination of commercial cabinets may be installed on the multiple system.

(Continued on next page)

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Models Available

The following domestic models are available, and cover a range suitable for installation in dwellings of varied sizes —

Brief Specifications of Domestic Models.

Model	Nett Storage Capacity	Height	Width	Depth	Shelf Space
	Cu. ft.	in.	in.	in.	Sq. ft.
ET45	4.1	56½	24½	20	5.84
ET65	6.6	63½	27½	23½	9.86
ET85	8.5	64½	30	24½	12.0
ET145	14.0	68½	39½	27	16.44

Electrice ET45 Mode
Suitable for small households or flats

Cabinet Construction

All cabinets are strongly constructed and designed for a maximum of convenience, combined with appearance

Insulation is of moisture-proofed cork board, of a thickness to suit local refrigeration requirements, and never less than 2 inches. Corkboard, of course, is unexcelled as a suitable insulating medium

Domestic cabinets are finished in white "ducoed" steel, with seamless interiors of white porcelain enamel.

Commercial cabinets may be obtained in any size, design and finish

Electrice ET145 Model
Suitable for large residences, guest houses, hotels, private hospitals, etc.

Built-in Cabinets

Models are available with or without broom high legs, thus becoming suitable for building-in to the kitchen or pantry, also special cabinets may be obtained with the compressor unit detached and operated from a basement or other portion of a building In such cases, the exterior dimensions (height) of the cabinet are reduced by about one-third.

Advantages of Electrical Refrigeration

Health—
Foods are kept in a dry atmosphere of under 50 deg. F., thus preventing fermentation of foodstuffs

Food Spoilage—
Saving in foodstuffs is considerable, and more than offsets operation cost

Operation Costs—
Usually about one-third that of ice, notwithstanding greater efficiency

Convenience—
No worry re ice man
No cleaning up mess
Less frequent shopping
Quicker and more effective cooling

The above advantages which are obtained per medium of an ELECTRICE refrigerator add materially to the saleability of any dwelling

(Continued on next page)

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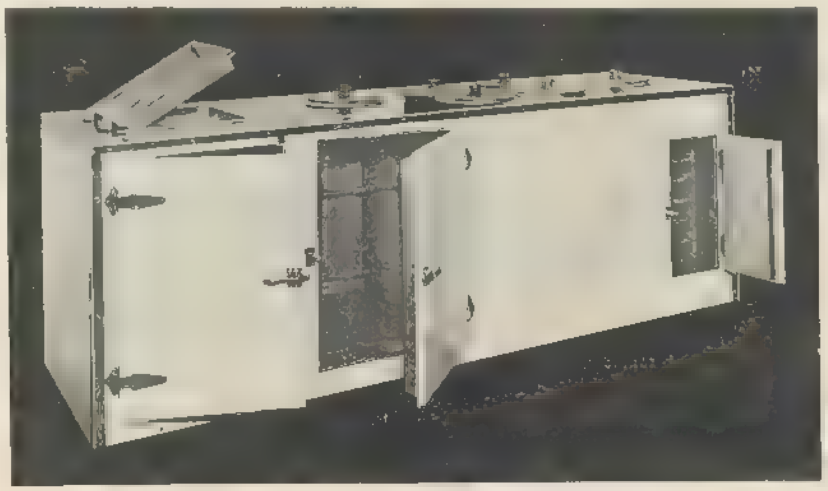
"ELECTRICE" COMMERCIAL ELECTRICAL REFRIGERATION

COMBINATION CABINETS

(Ice-Cube Maker, Ice-Cream Storage, Food or Bottle Storage)

ELECTRICE Combination Cabinets represent a distinctly forward stride in automatic refrigeration. Hitherto it has been necessary for confectioners, refreshment rooms, etc., to employ separate cabinets for ice cream, food and bottle storage and ice-cube making. Now, all three are combined in one cabinet and operated by one refrigerator unit, or, if any one of the three is not required, the remaining two services may be combined.

The ice-cube maker is a remarkable revenue producer. Children are rapidly deposing other confections in favour of fruit juice flavored ice-cubes. They are made at such ultra-low cost, and yield such a remarkably high net selling price that the profit percentage is little short of colossal. ELECTRICE Combination Cabinet is the finest income-earning investment possible in a business to which its use is especially suited.



Six Hole Combination Cabinet

Combining all the finer points of construction of the three individual types of cabinets, ELECTRICE Combination Cabinets are of the highest possible efficiency, and present a very imposing appearance. The exterior finish is white duco enamel, the top is of highly polished stainless steel, and the interior lining of the food or bottle storage compartment seamless zinc enamel. All fittings, such as door catches, are of finest quality and appearance.

Butchers' Cool Rooms

ELECTRICE is specially designed to meet the exacting and difficult conditions required for the refrigeration of butchers' rooms. The cross-fin coils employed occupy little space and, due to their extraordinary efficiency they introduce a standard of refrigeration hitherto unknown. The humidity is definitely controlled, natural circulation of air is attained, and temperatures are constant. Under these conditions the shrinkage of meat is reduced to a minimum, the colour is excellent, and wastage is eliminated.

Automatic operation of ELECTRICE frees the user from maintenance worries — especially during holiday periods.

The operating cost of ELECTRICE is materially lower (in some cases only one-third) than the cost of ice.

Commercial Cabinets

ELECTRICE produces standard cabinets from 15 c.ft. capacity to 100 c.ft., and these can be equipped with ice-making coils or finned coils (which do not make ice).

These cabinets are insulated with cork board, specially prepared and wrapped, and are finished in oak, maple, or white duco. Zinc or porcelain enamelled linings may be fitted up to 50 c.ft.; larger cabinets are lined with zinc or galvanized iron.

The shelf layout can be designed to fulfil special requirements.

Butchers' Cool Room.
Note accessible position of the Compressor Unit.

(Continued on next page)

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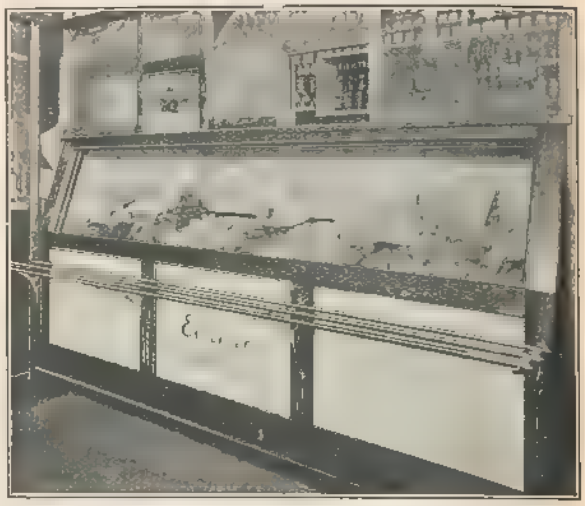
DISPLAY CABINETS



Eight-foot Maple Combined Display and Storage Counters (Front View)

Electrical refrigeration has been responsible for the introduction of refrigerated displays, which are of particular value to retailers of perishable goods. A display is considered essential to attract trade, but a summer display of certain products is impracticable unless encased in an electrically refrigerated display cabinet.

ELECTRICE display cases and counters may be had in any design or size to suit individual requirements. Special designs are built for butchers and smallgoods men, and they may be internally lighted with concealed lights.

A refrigerated display means an all-the-year-round display, and thus enables full value to be obtained from ground rent and overhead expenses.

FISH BOXES

The preservation of fish is one of the most difficult of refrigeration problems, and ELECTRICE has produced for the fishmonger storage cabinets of unique design. These cabinets have proved entirely successful in their field and can be thoroughly recommended for fish storage

The fish box is of the bin type, each bin being subdivided with shelves and rectangular baskets in order to attain ease and utility in handling.

The cabinet is finished in black duco with a monel metal top and lids, and is built to maintain low temperatures, with marked economy of operation.

DIMENSIONS (Exterior)

	Height	Width	Depth
(1)	30in.	6ft.	30in. (2 bins)
(2)	30in.	7ft. 4in.	30in. (2 bins)
(3)	30in.	10ft.	30in. (3 bins)

Fish Box and Unit Combined.
(Portable Type).

BEER COOLERS

ELECTRICE equipment is eminently suited for the cooling of draught beer. Automatic temperature control ensures a foaming measure always at 52 deg F, regardless of the fluctuations of air temperatures.

The busiest period can be effectively handled by the ELECTRICE-equipped bar, and the sudden and almost continuous demand of the peak hour (5 p.m. to 6 p.m.) can be adequately and automatically taken care of.

Operating costs are only a fraction of the cost of ice.

ELECTRICE Refrigerators are also available in all sizes for bottle cooling.

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SECTION T

[Containing S.A.A. Filing Section No. 33]

LIFTS,

ESCALATORS AND ACCESSORIES

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

33b

S.A.A. File No.

HYDRAULIC POWER, ELECTRIC AND HYDRAULIC LIFTS LIMITED

Lift Contractors and General Engineering

14 MARTIN PLACE, SYDNEY

HYDRAULIC AND ELECTRIC LIFTS

POWER SUPPLY

The Company

The company are suppliers of power under high pressure system (700 lbs. pressure per square inch) to Passenger Lifts, Goods Lifts, Wool Dumps and Presses, and all other classes of machinery, continuously day and night throughout the year

Service

Lifts and Machinery worked by the company's power have given satisfaction since their installation dating back twenty, thirty and forty years ago The supply never ceases, and is always on hand and reliable, whenever required, by simply opening the lift valve

Mains (See Map on opposite page)

The company controls all the feed mains of its own Water Supply for the use of clients' requirements in whatever capacity is required such exclusive feeding service maintaining a continuity of supply to each installation. A comprehensive survey layout showing the various routes of the company's mains can also be inspected at the head office.

There are fifty miles of pressure mains laid throughout the principal streets of Sydney

Charges

After adjustment for interest on the initial cost is taken into account, together with renewals, repairs and maintenance, special reserve to replace complete installation at a given period and cost of power, the Hydraulic Lift will be found an up-to-date economical proposition

Fire Prevention

As a special feature can be added the adaptability of the hydraulic service to all fire sprinkler and drencher equipment, thus reducing cost of insurance for fire risk by 50 per cent The company have an adequate and independent freehold supply of water which, being used from its own mains, can maintain service to all the requirements demanded, doing away with the necessity of tank installation overhead

HYDRAULIC LIFTS

Speed

Hydraulic lifts are designed and constructed to travel with safety and comfort at fast speeds with full loads conforming at all time to the regulations as laid down by the Lifts and Scaffolding Department of New South Wales Properly constructed they are quick and smooth in running and economical in upkeep

Reliability

The machinery and equipment is installed for long and reliable service, and manufactured and equipped under conditions which maintain maximum efficiency in all departments of lift engineering Owners who desire to ensure that tenants and their clients can travel up and down from the various floors of their building at all times with certainty and safety should insist upon having an up-to-date hydraulic lift installed in all their premises

Life and Operation

There is practically no limit to the life of an Hydraulic Lift, and no limitation in performance, its action is controlled by sound and simple mechanism, which has few wearing parts. In London, Sydney and Melbourne, installations are giving excellent performance after forty years' service

Maintenance

The company at all times provides service for the maintenance of all installations securing to clients special supervision by the Company that is most interested in prolonging the usefulness of the Hydraulic Lifts

Information

Authentic information concerning Hydraulic Lifts, etc., and the Company's Power, can only be obtained at the Head Office of the Company—outside information is mostly guesswork.

ELECTRIC LIFTS

The Company is fully equipped for carrying out the installation of Electric Lifts of the Geared Type, the manufacture of which is 90 per cent. Australian

The Geared Machine employs a worm and worm wheel reduction gear specially designed to transfer the energy from the motor to the winding member or traction sheave and in conjunction with Traction Sheave to determine the speed of the lift car

Car Speeds obtainable with this type of machine cover a full range up to 400 ft. per minute

Control of the Lift for Passenger or Goods Service may be either by a self centring switch fixed in the car and operated by an attendant, or by push buttons fixed in the car and each landing served This second system may be operated without the necessity of an attendant

A combination of there two systems fitted to the lift is known as dual control.

Service Lifts may be fitted with either "Call and Send" button control or "Single Call" button control The former system provided by means of push buttons fixed at each landing served, for the lift car to be called or sent to a landing and later for the lift car to be called only to a landing

Enclosures of all types and designs are provided for with manual or operated doors.

Signal and Annunciator System to suit the requirements of particular conditions are included in the Company's installations

Maintenance.—The proper care of the lift after installation is essential if the maximum service and safety is to be obtained The Company provides a special staff to meet this requirement for all lifts.

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From the collections of Sydney Living Museums / Historic Houses Trust of NSW

LIFTS

THE ASSOCIATED GENERAL ELECTRIC INDUSTRIES LTD.

33b

OFFICES

N.S.W.—The Associated General Electric Industries Ltd., 95 Clarence Street, Sydney, and at Keen Street, Lismore, 53 King Street, Newcastle

VICTORIA—The Associated General Electric Industries Ltd., 108 Queen Street, Melbourne

S.A.—The Associated General Electric Industries Ltd., 25 Grenfell Street, Adelaide

QUEENSLAND — The Associated General Electric Industries Ltd., Kelvin House, Adelaide Street, Brisbane, and at 158 East Street, Rockhampton; Flinders Street East, Townsville

W.A.—Agents.—Messrs. Atkins (W.A.) Ltd., 894 Hay Street, Perth

TASMANIA — Agents.—Messrs. Oliver and Oliver Pty. Ltd., 9 Argyle Street, Hobart, and at Quadrant, Launceston.

REPRESENTING—

British Thomson-Houston Co. Ltd.
Ferguson, Pailin Limited
International General Electric Co. Incorp.
Metropolitan-Vickers Electrical Co. Ltd.

S.A.A. File No.

[For Other Products, See Index]

Products

Complete electric lifts or elevators for passenger, goods and service.

Design and Manufacture

With the extensive manufacturing facilities available in its various Australian factories, Associated General Electric Industries Ltd. is able to offer building owners, architects and engineers a product combining the advantages of manufacture as a complete unit to meet Australian conditions and the latest developments in elevator engineering as practised by our overseas principals.

The layout and choice of an elevator installation materially affects the ultimate result achieved in any building project as measured by the effective annual return of income to the owner. This company, therefore, gladly offers the services of its Elevator Engineering Specialists to all interested in these problems with a view to assisting this essential question in modern building requirements.

Associated General Electric has devoted much time to the various problems affecting the safety, reliability and comfort of modern elevators, and installations are limited strictly to those of first quality in these respects.

Modern elevators are pre-eminently electric machines therefore, they should be studied and compared as such. With the research facilities which this company and its associates have, the latest contributions to elevator progress are always available to purchasers.

Choice of Equipment

To meet the varying conditions of building design, lay outs and locations, this company is able to offer a very wide range of equipment to cover all requirements. Briefly, these may be summarised as follows:

1. Geared traction machines incorporating.—
   (a) Single or multi-speed alternating or direct current motors;
   (b) Rheostatic control; or
   (c) Variable voltage control.
2. Gearless traction machines incorporating:—
   (a) Rheostatic control;
   (b) Variable voltage control.

Broadly speaking, machines classified as the geared traction type are used with elevator car speeds ranging up to approximately 400 feet per minute. For higher car speeds up to and even in excess of 900 feet per minute gearless traction type machines are used and incorporate all the latest refinements in modern elevator control.

Control

Associated General Electric elevators employ a system of automatic levelling characterised by accurate response, speed, reliability and extreme simplicity. This system, which employs standard "Pliotron" Levelling Units," does not involve any mechanical moving parts either in the hatchway or in the motor room and remains permanently adjusted for all times, as no steel tapes, ropes or floor selectors are necessary.

The levelling operation is accomplished on the main traction motor.

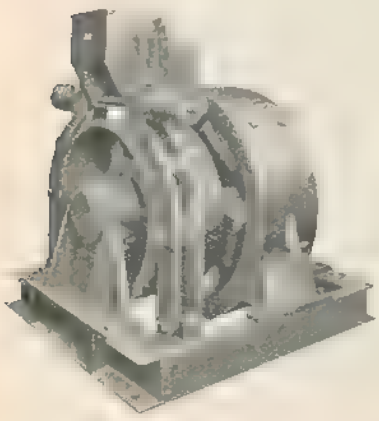
Among the various forms of elevator control which this company is able to offer, the following are the more important:

(a) Car switch, with or without "Flying Stop" automatic levelling,
(b) Departmental store;
(c) Pre-registering signal,
(d) Collective automatic push button,
(e) Selective bank control.

Accessories

Signal Equipment. The importance [illegible] an elevator installation cannot [illegible] order to maintain round trip running [illegible] must be given to the efficiency of the signal equipment installed. Annunciator systems of the mechanical or electrical type, with or without cross cancelling features, can be provided.

Electric Door Operators.—The question of the time taken to open and close car and landing doors in modern departmental stores and office building installations, involves the use of power-operating mechanisms preferably of the electric type. This company is able to offer a simple and reliable form of door operator specified as "Power-Way Type 1400."



Gearless Traction Motor and Machine.

Motor-Generator Set for Variable Voltage System.

Control Panel for Variable Voltage System.

ASSOCIATED GENERAL ELECTRIC LIFT EQUIPMENT

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

33b

S.A.A. File No.

MAJOR, STEVENS & COATES LTD.

Head Office and Works: CHIPPENDALE, SYDNEY, N.S.W.

Telegrams: MAJENSCO

Sole Australian Representatives of THE EXPRESS LIFT CO. LTD., LONDON, INCORPORATING SMITH, MAJOR & STEVENS LTD

Brisbane Office: EXTON HOUSE, QUEEN STREET, BRISBANE

Victorian Representatives: AUSTRAL OTIS ENGINEERING CO. LTD., SOUTH MELBOURNE

BRITISH MSC LIFTS

Products

Electric Lifts for all services, Glydeways (Escalators), Lift appurtenances of every description, Lift Cars and Enclosures, Maintenance and Repair Service, Hydraulic Lifts and Hoists, High Pressure Wool Presses, Hydro-Electric Entrance Gates, Hand Power Lifts, General Engineering

Service

Our organisation ensures immediate attention to all enquiries. Estimates, together with planned proposals, furnished with fullest details. Our Maintenance and Repair Service forms an important unit in our organisation, as we realise after-care is of paramount importance.

Electric Lifts:

Types—Speeds

The type of Passenger Elevator to be selected for a given duty should, in the main, be governed by the cage speed and also class of service considered most desirable, and in this selection first cost considerations vary to some extent

In modern buildings containing (8) or more floors, a cage speed of not less than 400 feet per minute is desirable in the interests of efficiency of service, and in these cases the Gearless type Elevator, with its many refinements, is essential. For Gearless Equipment refer to page 483

Portion of Main Motor Room, The Grace Building Sydney, showing three of battery of six Passenger Lift Machines

For Goods Traffic and for Passenger Service operating with speeds below 400 feet per minute, geared type engines with rheostatic control will be found efficient, whilst the first cost of installation is considerably lower than for gearless engines.

It is important that the speed available for stopping should ensure comfortable and reasonably accurate floor stops.

Geared engines designed for speeds approaching 400 feet per minute may be furnished with the variable voltage control system, thus ensuring all refinements and efficiency inherent with this system.

Silent Operation

In connection with lifts operating through alternating current supply, we have recently introduced our rectified current control unit, by means of which the unpleasant noise inherent with alternating current control is eliminated—a most important factor in residential flats, etc

Hydraulic Lifts and Machinery

We specialise in hydraulically-operated equipment for all purposes. Hydraulic lifts and whip hoists for all duties; high pressure wool dumping plants, product presses.

Entrance Gates for Buildings

We have recently developed and installed hydraulically-operated entrance gates, electrically controlled by push button system, the system of interlocking entirely eliminating the possibility of interference by unauthorised persons.

Glydeways

(Escalators)

During recent years our British principals have designed and manufactured Glydeways combining the most modern developments.

The Glydeway is constructed as a self-contained unit, and may be set for operation in either direction, according to flow of traffic.

The design is so conceived that outstanding features embrace simplicity and safety in operation and riding comfort, whilst the handrail, travelling in unity with the stairs, imparts a feeling of security to users.

Glydeways are made in various standard widths according to the transportation capacity required, ranging from 3,000 to 8,000 or more persons per hour. We would gladly furnish advance details of constructional requirements to accommodate Glydeway installation.

Glydeway (Moving Staircase)

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

LIFTS

GEARED AND GEARLESS

EXPRESS WESTINGHOUSE

BRITISH BUILT GEARLESS LIFTS
AND
VARIABLE VOLTAGE CONTROL EQUIPMENT
FOR GEARED LIFTS

Sole Representatives and Selling Agents for Australia:
MAJOR STEVENS & COATES LTD.
Offices and Works:
CHIPPENDALE, SYDNEY

Representatives for Victoria and South Australia.
JOHNS & WAYGOOD LTD.
Offices and Works.
CITY ROAD, SOUTH MELBOURNE.

33*b*

S.A.A. File No.

Westinghouse exclusive designs and paramount features incorporated with British material and workmanship have resulted in the realisation of perfect vertical transportation.

Variable Voltage Control

This type of control furnished with Gearless or Geared Elevators provides ideal control where exacting service requirements necessitate smooth and rapid acceleration and retardation, maximum riding comfort, quiet operation and power economy.

Automatic Inducer Levelling

Where it is desirable to obtain cage speeds of, say, 400 ft. and upwards, Automatic Inducer Levelling System is furnished

The result achieved is a definite and accurate floor stop automatically accomplished irrespective of the skill of the operator, and ensuring the car will neither stop short nor overrun floor level.

The control enables the highest possible speed range being attained in the distance available between floor stops, and entirely eliminates loss of time in re-levelling.

Mechanical contacts hitherto used and located in the lift well were apt to create a certain amount of noise, and so destroy the otherwise quiet running of the lift. With inducer levelling mechanical contacts are entirely dispensed with and the operation is the smoothest and quietest yet produced, the only parts located in the lift well and car are the slowing and stopping plates and the inducer box, which pass, but do not touch each other. The necessary switches and contacts are all located on the main controller in the Motor Room

Types of Control

Any desirable system of control may be selected from the following:—

Car Switch Control

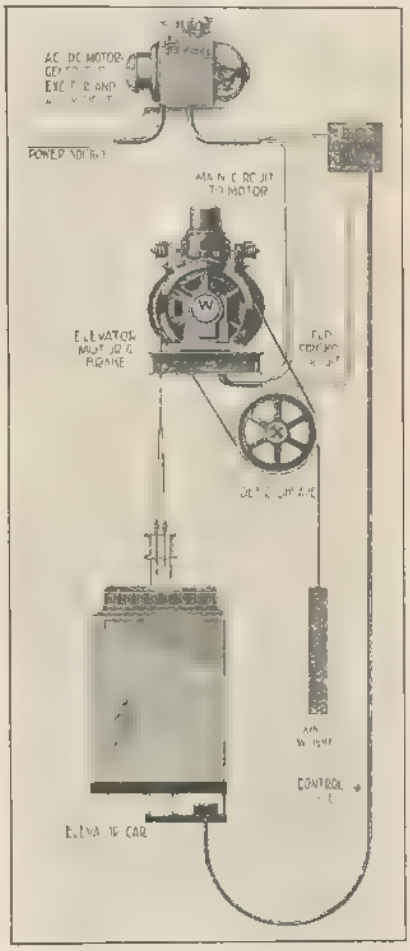
For operation by attendant, and furnished with wide speed range.

Full Automatic Push Button Control

With which the user is given complete individual control by means of Push Buttons situate in car and on floor landings.

Dual Control

Combining car switch operation by attendant during busy periods, and automatic push button control without attendant for use in slack periods.



A VARIABLE VOLTAGE GEARLESS LIFT ARRANGEMENT.

The Lift is controlled through the medium of a Motor Generator Set.

Types of Control—(*Contd.*)

Two-Button Multi-Call (Collective Automatic) Control

This system of control ensures car answering in directional sequence all calls registered by floor buttons, each landing being furnished with one (1) pair of "Up" and "Down" Buttons.

Calls registered on bank of buttons provided in car will also be attended to in sequence with floor calls and direction of travel

This system eliminates the necessity of a caller waiting for a disengaged car, and reduces to a minimum the waste of energy consumed by the ordinary individual control type automatic system.

The two-button multi-call control may be furnished for Automatic operation only, or combined with car switch operation to provide dual control features, the change over being effected instantly.

Inter-connected Directional Signal System for a Bank of two or more Lifts

With this system two or more cars are signalled simultaneously by the pressing of a single button for the direction desired. The call will be answered by the car nearest to the calling floor, and will simultaneously cancel the registered call in the remaining car or cars

The above system may be applied to elevators controlled by two-button multi-call control for automatic operation only, or by means of attendant in car, the latter being advisable where power operation is utilised for controlling the operation of the enclosure doors.

Power Door Operators

These may be furnished by electric or pneumatic power system for the car gates, and also enclosure gates, the equipment being so designed that any tendency of danger to persons has been entirely eliminated.

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

33b

S A A File No.

JOHNS & WAYGOOD LIMITED

LIFT ENGINEERS

CITY ROAD, SOUTH MELBOURNE, VICTORIA

TELEPHONES: M.1241 (6 lines).

33b

S A A File No.

[For other Products, see Index]

Gearless Lifts

(See pages 483 and 487)

Car Speeds—300 F P M and upwards.
Loads—To suit all variations of lift service

Hydro-Electric Lifts

The most economical type of lift for small travels up to 25 ft. Goods or passenger types. Loads—500 to 3,000 pounds.

Lift Accessories

Car Position Indicators, all types
Annunciating Systems, all types
Illuminated Thresholds, all types.
Machine Unit Door Frames, all types.
Rollsway Door Hangers, all types.
Rollsway Door Closers, all types.
Peelle Type Fireproof Lift Doors.
Double Folding Lift Doors.
Automatic Floor Levelling.

Service

Maintenance Testing Repairs. Quick service by expert mechanics is available at any time, day or night. Lift arrangement drawings and other planning services are readily available. Ring M 1241 and ask for our Lift Service Department

LIFTS by JOHNS & WAYGOOD LTD.

INSTALLED IN OVER 600 MELBOURNE BUILDINGS

Geared Lifts

Passenger—Goods—Service.
Loads 100 to 10,000 pounds.
Car Speeds—50 to 400 F P.M.

Hydraulic Lifts

Passenger—Goods
High Pressure—Low Pressure.
Suspended—Direct Acting.
Loads—500 to 7,000 pounds

Special Types

Hospital Stretcher Lifts.
Hospital Dinner Lifts.
Motor Car Lifts.
Electric Dumbwaiters.
Orchestra Platforms.
Escalators.

Plant and Workmanship

All parts are standardised. Every lift is tested in the testing lift well at our works prior to erection on the site. Our organisation includes the drawing office, developmental and research section electrical, machine, fitting, pattern, carpenter, structural steel, painting, outside erection, maintenance and testing departments

Metropolitan Elec. Supply Building

Manchester Unity Building

A.M.P. Building

THREE OUTSTANDING BUILDINGS
EQUIPPED WITH LIFTS BY JOHNS & WAYGOOD LTD.

(Continued on next page)

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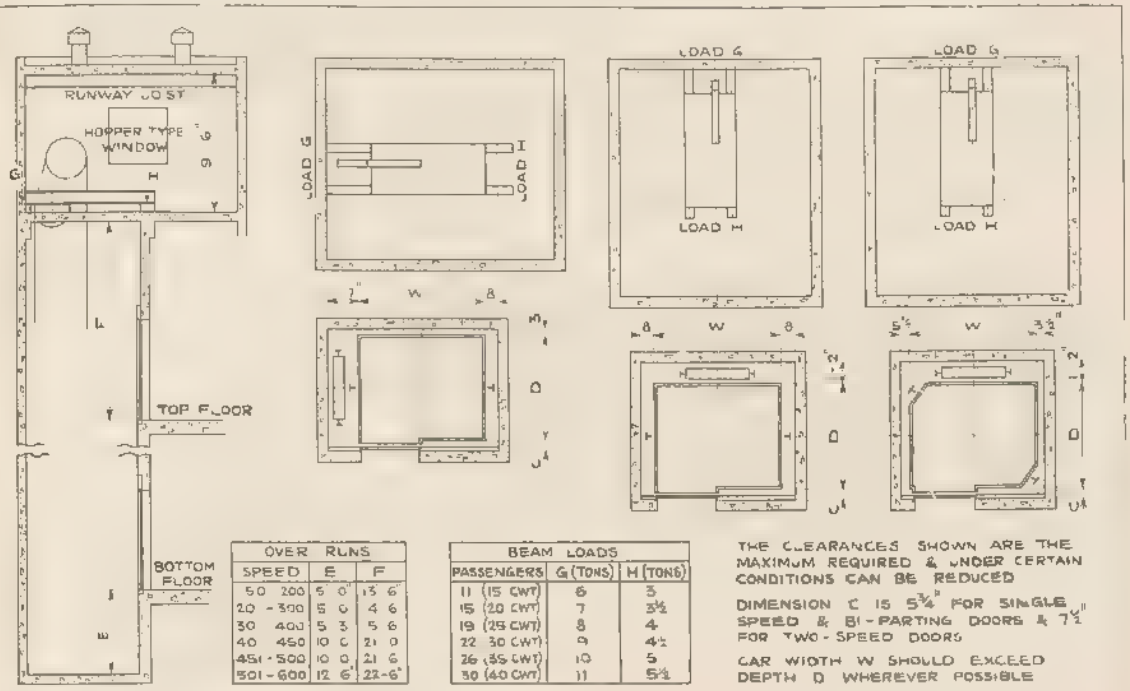
INFORMATION ON THE DESIGN AND SPECIFICATION OF LIFTS



OVER RUNS		
SPEED	E	F
50 200	5 0"	13 6"
20 - 300	5 0	4 6
30 400	5 3	5 6
40 450	10 0	21 0
451 - 500	10 0	21 6
501 - 600	12 6"	22-6"

BEAM LOADS		
PASSENGERS	G (TONS)	H (TONS)
11 (15 CWT)	6	3
15 (20 CWT)	7	3½
19 (25 CWT)	8	4
22 30 CWT)	9	4½
26 (35 CWT)	10	5
30 (40 CWT)	11	5½

THE CLEARANCES SHOWN ARE THE MAXIMUM REQUIRED & UNDER CERTAIN CONDITIONS CAN BE REDUCED

DIMENSION C IS 5¾" FOR SINGLE SPEED & BI-PARTING DOORS & 7½" FOR TWO-SPEED DOORS

CAR WIDTH W SHOULD EXCEED DEPTH D WHEREVER POSSIBLE

PRELIMINARY DETAILS FOR DESIGN OF ELECTRIC LIFT WELL AND MACHINERY ROOM

NUMBER OF PASSENGERS

Car Depth	CAR WIDTH 3'-6"	4'-0"	4'-3"	4'-6"	4'-9"	5'-0"	5'-3"	5'-6"	5'-9"	6'-0"	6'-3"	6'-6"	6'-9"	7'-0"
3'-0"	5	6	6	7	7	7	8	8	9	9			—	—
3'-6"	6	7	7	8	8	9	9	10	10	10	11		—	—
4'-0"	7	8	8	9	9	10	10		11	12	12	13		—
4'-3"	7	8	9	10	10	11	11	12	12	13	13	14	14	—
4'-6"	8	9	10	10	11	11	12	12	13	13	14	15	15	16
4'-9"	8	10	10	11	11	12	12	13	14	14	15	15	16	17
5'-0"	9	10	11	11	12	13	13	14	14	15	16	16	17	18
5'-3"	—	11	11	12	12	13	14	14	15	16	16	17	18	18
5'-6"			12	12	13	14	14	15	16	17	17	18	19	19
5'-9"				13	14	14	15	16	17	17	18	19	19	20
6'-0"	—	—	—		14	15	16	17	17	18	19	20	20	21

SIZES OF CARS FOR PASSENGER LOADS.
(Based on 2 Square Feet per Passenger)

NOTE—On the larger sizes of car the space required per passenger can be slightly reduced

Average Sizes of Lift Cars

	Wide	Deep
Office Buildings	6'-0"	5'-0"
Department Stores . .	[illegible]	[illegible]
Hospital Bed Lifts	[illegible]	[illegible]
Dumbwaiters	[illegible]	[illegible]
Motor Car Lifts . . .	[illegible]	[illegible]
Warehouse Goods Lifts	[illegible] 0"	[illegible]

Suggested Standard Sizes of Finished Door Openings

	Wide	Deep
Single Speed	[illegible]	[illegible]
Bi-Parting	[illegible]	[illegible]
Two-Speed	[illegible]	[illegible]

For further information ring M.1241, and ask for Lift Service Department.

LIFT WELL CONSTRUCTION

The walls of a fireproof lift well are usually constructed in 4-inch thick concrete, 6-inch terra cotta, or 9-inch brickwork.

With Machine Unit Door-frame construction, the frames may be either built in as the work progresses or the fronts of the lift well may be temporarily left out. The frames are then erected starting from the top floor and working down. This latter method used in conjunction with terra cotta fronts has advantages, particularly as it facilitates the placing of the frames accurately in line and plumb.

(Continued on next page)

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PRELIMINARY PARTICULARS REQUIRED FOR PREPARATION OF LIFT ESTIMATE

This information should prove helpful to anyone desirous of preparing an outline specification for the purpose of obtaining a lift estimate.

TYPE OF LIFT. *Passenger or goods Geared or gearless*

CONTROL.—*Car switch or automatic or collective, etc.*

POWER *Direct or alternating current. Voltage*

LOAD—*In pounds Allow 150 pounds for each passenger*

TRAVEL. *-In feet from bottom floor level to top floor level*

FLOORS—*Number of floors to be served and their names, such as B., G., 1, 2, 3, etc.*

CAR SPEED—*In feet per minute.*

POSITION OF GEAR.—*(a) Overhead; (b) In basement*

CAR PLATFORM. *Width and depth in feet and inches.*

CAR SUPERSTRUCTURE *-Prime cost value*

DOORS *Number of doors, type, material.*

ENCLOSURES—*Type, such as concrete, brick, terra cotta or ornamental steel or wood.*

POWER SUPPLY MAINS.—*(a) By owner; (b) By lift contractor*

GUIDES—*(a) Tee section; (b) Round steel on wood backings*

ANNUNCIATOR SYSTEM.—*Type*

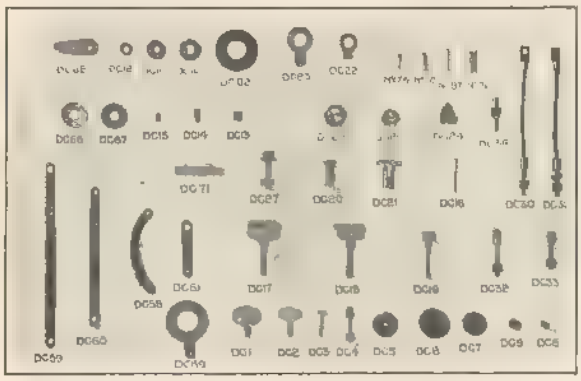
CAR POSITION INDICATORS.—*If required, state type*

LIGHT IN CAR *State if special fitting required*

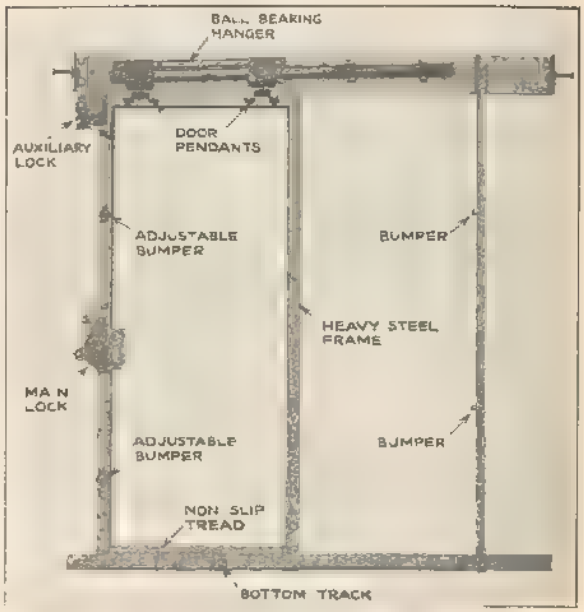
RADIATOR OUTLET *State if required*

AUTOMATIC FLOOR LEVELLING—*State if required*

SPECIAL ACCESSORIES.—*Machine unit door frames, door checks, architraves, illuminated push buttons, illuminated thresholds, etc.*



This illustration shows how the thousands of parts in our modern Lifts are standardised and classified.



MACHINE UNIT DOOR FRAME.
Note all the door accessories which are mounted on the heavy steel frame as a complete unit before erection on the site.

ESCALATORS

In buildings where the transport of large numbers of the public between any two successive floors is involved, such as department stores, apparatus in continuous motion possesses certain definite advantages. These advantages are best realised by the installation of moving stairways or Escalators.

Our Escalators are built to suit all purposes.

Single File, 70 to 90 F.P.M.; 3,000-4,000 persons per hour.

Double File, 70 to 90 F.P.M.; 6,000-8,000 persons per hour.

These Escalators are constructed as self-contained units and may be installed singly or in a duplex arrangement.

The Escalators are reversible, enabling them to be operated in either direction. They also can be brought to rest and used as ordinary flights of stairs.

The handrail moves at the same speed as the stairs, enabling passengers to rest their hands on the handrail throughout the entire journey.

Sound deadening material is used wherever the motion of moving parts would in the ordinary way cause a considerable amount of noise.

The starting and stopping are effected by simple push buttons conveniently located.

Building layouts for Escalators will be gladly supplied. Ring our Service Department, M.1241.

LIFTS by JOHNS & WAYGOOD LTD.

(Continued on next page)

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EXPRESS - WESTINGHOUSE

GEARLESS LIFTS

AND

VARIABLE VOLTAGE GEARED EQUIPMENT

(SUPPLIED AND INSTALLED IN VICTORIA AND SOUTH AUST. BY JOHNS & WAYGOOD LTD.)

[See also Page 483]

ADVANTAGES

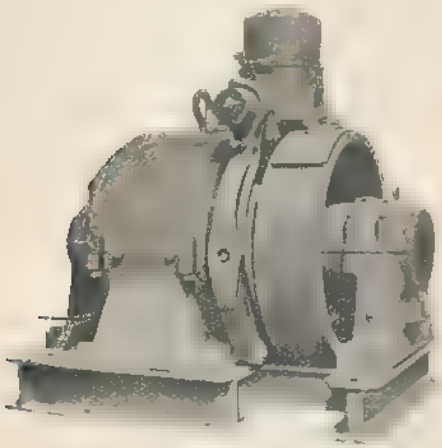
The Gearless Lift offers that quiet, smooth operation which is the realisation of perfect vertical transportation

It permits of the fastest speeds, combined with rapid acceleration and retardation. These are achieved with remarkable riding comfort.

Accurate stops are made independent of any skill on the part of the operator.

In many instances fewer lifts are required, with a corresponding saving in floor space and running expenses.

Where lifts are continuously operated an appreciable saving in current is effected.



WESTINGHOUSE GEARLESS MOTOR
British built under License

Melbourne Buildings Equipped with Gearless Lifts by Johns & Waygood Ltd.

A.M.P.	2 Lifts	450 F.P.M
Metro. Elec. Supply. . .	3 Lifts	450 F.P.M
State Savings Bank . .	2 Lifts	450 F.P.M
Myer Emporium . .	2 Lifts	450 F.P.M
Manchester Unity . . .	3 Lifts	600 F.P.M

Two Variable Voltage Geared Lifts have been installed in St. Vincent's Hospital

TYPES

In these Gearless Lifts and Variable Voltage Geared Equipment there are exclusive designs and features

Variable Voltage Control

This control is furnished with a Motor Generator and offers all the advantages of such control for both direct current and alternating current supplies.

Automatic Inducer Levelling

With this system the lift car travels directly to the floor without first over running or stopping short and being afterwards levelled.

Furthermore, the operation is entirely automatic, so that fast and accurate landings are made, without exception, at every floor irrespective of the load in the car

Two Button Multi-Call (Collective) Control

This control enjoys great popularity because of its ability to handle large volumes of traffic without an attendant.

Every call from a button is registered and is maintained until answered by the car.

Directional Signal System

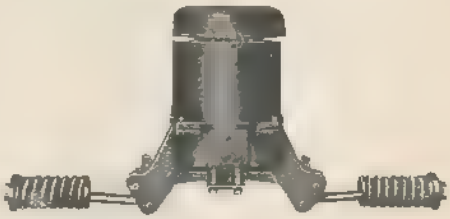
This system is intended for a bank of two or more lifts, and offers the same advantages as multi-call control with the additional feature of synchronising the cars

Attendants are sometimes retained for the purpose of directing passengers and operating the doors.

Special Control for Department Stores

This control automatically stops the car at every landing and permits the attendant to devote all his attention to directing passengers.

The attendant can, when necessary, run express past any number of floors



BRAKE MAGNET AND MECHANISM
This Brake has been described as one of the finest pieces of Electro Dynamic Machinery made

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33a

S A A File No

WAYGOOD OTIS (AUST.) PTY. LTD.

HEAD OFFICE & WORKS, HAYES ROAD & DUNNING AVENUE, WATERLOO, N.S.W.
Telegrams: Lyndentree, Sydney.

BRANCH OFFICES AND SERVICE STATIONS:

MELBOURNE: 80 Queen's Bridge Street, South Melbourne.
Telegrams: Waygotis, Melbourne.

BRISBANE: Albert House, Albert Street.
Telegrams, Lyndentree Brisbane.

NEWCASTLE: Tyrill House, Telford Street.

ADELAIDE 7 Twin Street.
Telegrams: Lyndentree, Adelaide.

PERTH: 383-7 Murray Street.
Telegrams, Lyndentree, Perth

ASSOCIATED COMPANIES

Waygood Otis Ltd., London.
Waygood-Otis (N.Z.) Ltd., Wellington, N.Z.
Waygood-Otis (S.A.) Ltd., Durban S. Africa
Otis Elevator Company, New York.

And Offices in the Chief Cities throughout the World.

LIFTS

Products

Electric Lifts or Elevators for Passengers, Goods and Service; Escalators; Mail Chutes; Doors and Enclosures, Lift Cars; Door Closers; Lift Position Indicators; Signals and Accessories. Lift Service and Repairs.

Planning Service

The laying out and deciding upon an elevator system in a modern building is one of the most important items with which the architect has to deal, and one which will vitally affect the success of the building as an investment. In more than seventy five years of manufacture and installation of elevators, the Waygood Otis organisation has accumulated a vast amount of data as to elevator performances and requirements for buildings of various types and heights. We are glad indeed to place all of this information at the disposal of the architects and owners, and will, without cost, submit recommendations for elevator equipment in proposed buildings. Our nearest branch office is at your service at any time.

Design and Manufacture

All Waygood-Otis Machines, Motors, Controllers, Safety Devices, and other apparatus are manufactured in their entirety in Waygood Otis factories and from Waygood-Otis designs, which are the result of years of experience. The Waygood-Otis elevator is, therefore, not an assembly of non-related parts, but of parts which are so designed and constructed as to operate together as a unit.

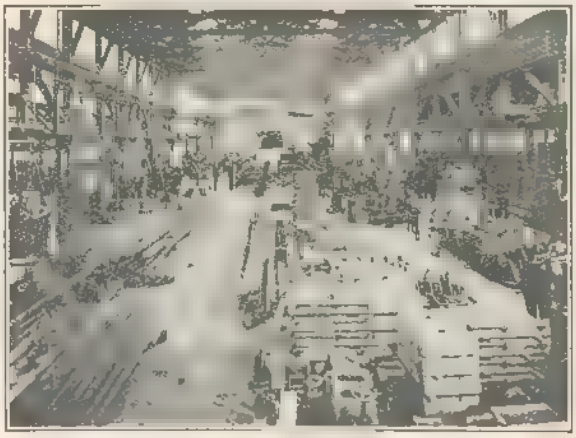
Elevator Accessory Apparatus

We are now offering a complete line of elevator accessory apparatus and appliances These are all made in Waygood Otis factories with the same care and under the same supervision and high standards of workmanship as are the elevator machines. This ensures to the purchaser appliances manufactured particularly for the machines with which they are to be used, and, therefore, more efficient than ordinary commercial parts assembled with other makes of apparatus.

Waygood-Otis Service

To derive the fullest possible benefit from any installation of Waygood Otis elevators, it is essential that the machines be properly maintained, otherwise, they will not provide the high class of service of which they are capable.

We are prepared to take care of machines under many forms of Waygood-Otis Service This includes a regular examination, oiling and cleaning of the apparatus at stated intervals, and advising the owner or tenant of matters that should have attention. Other services include, not only the examination of the apparatus, but also the replacement of worn parts.



View of Main Bay, Waterloo Works.

Maintenance

Under Waygood Otis Maintenance Service we assume full care of the machine making regular examinations and adjustments, furnishing all parts required for replacement, including ropes and any of the larger wearing parts, at a stipulated sum per year.

(Continued on next page

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ELECTRIC ELEVATORS

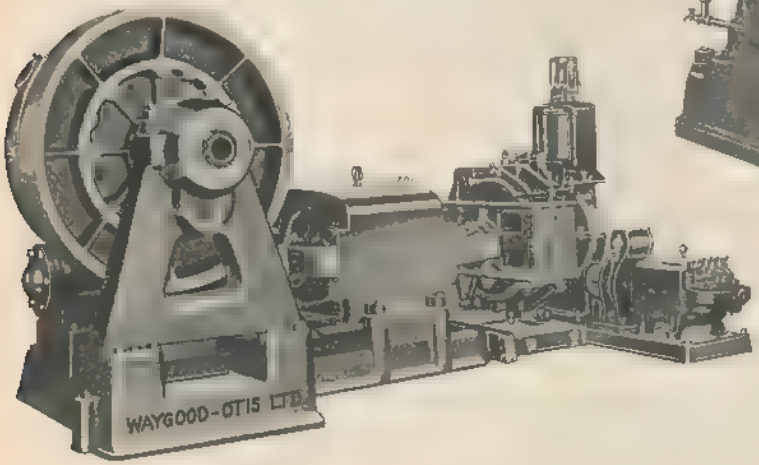
Types

Electric Elevators as now installed are divided into two classes: the single wrap or geared traction, and the gearless traction. The single wrap traction has superseded the old drum type, as it is much more efficient and has the inherent safety feature of traction drive. The gearless traction type of elevator is used exclusively for the higher speeds and for the highest class of service

Single Wrap Geared Traction Elevators

On this type of elevator the car is driven through a driving sheave, operated through worm-gearing by a motor of 700 to 900 rev. per minute. Car speeds range up to 400 feet per minute.

This type of machine is generally used for freight work and for moderate passenger requirements where conditions of rise, load, speed, and required service would not warrant the use of the higher grade gearless elevator



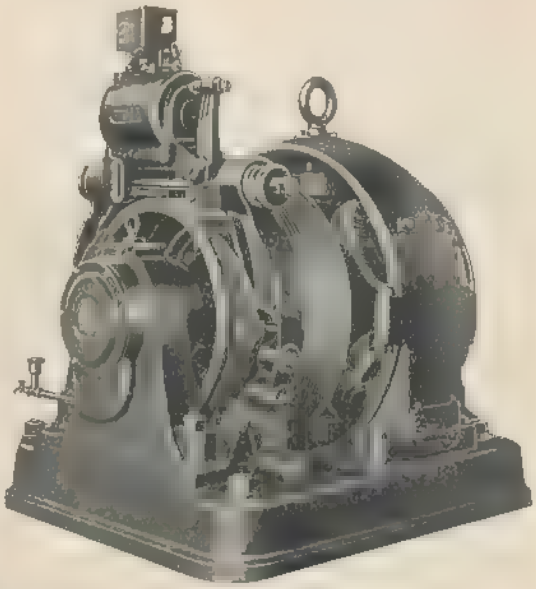
Geared Micro-Drive Traction Machine.

Gearless Traction Elevators

The gearless traction elevator is the highest development of the electric elevator, and provides car speeds up to 900 feet. per minute. This type of elevator employs a slow-speed high-torque motor, with a driving sheave mounted on a spider, which is integral with the armature shaft. All intermediate gearing is thus eliminated, as the slow-speed motor enables the car to be driven directly from the sheave, by means of ropes which pass around the sheave, and then to the car and the counterweight

Rapid and smooth operation, starting and stopping, and very high efficiency are features of this machine

In cases where larger capacities at more moderate car speeds are required, this type of machine can still be utilised by roping the car and counter-weight on a 2 : 1 arrangement.



Gearless Traction Machine.

Micro-Levelling Elevators

Increased demands for higher efficiency in elevator service, for both high-speed passenger and heavy-duty freight elevators, have been met by Waygood-Otis in the Micro-Levelling Electric Elevator, with either car switch or automatic control, and of either the gearless traction or geared traction type.

When the car reaches the micro zone for the floor where it is intended to stop, the car is automatically brought level with this landing, irrespective of load and speed, and also maintains the platform at that level, regardless of changes in the load on the platform or stretch of ropes All this levelling operation is performed entirely automatically and independently of the operator

This eliminates the stumbling hazard on passenger elevators, and obviates the possibility of damage to goods or trucks so often caused by uneven levels when loading and unloading freight elevators. It eliminates false stops at the floors, thus saving time in transferring passengers or freight, and increasing the quantity and quality of service. It reduces the cost of current; saves wear and tear on the apparatus, and prolongs its life.

ESCALATORS

Escalators or Moving Stairways

Used wherever it is desired to move people in great numbers continuously and rapidly. They may be made reversible so as to conform to the changes in flow of traffic during the day, and can be installed for both up and down service They operate continuously, with no waiting interval, and carry large numbers of people comfortably, quickly, and without exertion. They require small motors on account of being constant-running, hence the operating cost is very low

Waygood-Otis Escalators are made in three sizes:—

Distance between balustrading	Capacity per hour
2 feet	4,000
3 feet	6,000
4 feet	8,000

Angle of inclination—30 deg.

Consult us early to ensure correct position of floor beams.

(Continued on next page)

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CONTROL SYSTEMS FOR ELECTRIC ELEVATORS

Car Switch Control

The most generally used form of control is the switch in the car operated by an attendant the control being a self-centreing handle.

Automatic Push Button

This type of control meets, with full safety, the requirements of service without an attendant. Call buttons at each landing and a full set of operating buttons in the car provide for the operation. The design is such that the landing buttons are rendered inoperative immediately the passenger enters the car.

Dual Control

Dual control combines "Car Switch" and "Automatic Push Button"—one control at a time being available.

Double Button

This control consists of up and down buttons in the car and at each floor. Constant pressure will call the car to any floor, if the gates are closed and it is not already in use, and pressure upon either button in the car will cause the car to travel in the desired direction. This form is only used for goods service.

Department Store Control

This control embodies power-operated doors and self-levelling, with automatic starting and stopping of the lift at each floor, unless the operator desires to pass a floor, in which case he holds his switch to the "Full on" position. The centreing of the switch after passing a floor causes the lift to automatically slow down and stop at the next landing.

Flying Stop Control

This is a form of car switch control in which the slowing down and stopping at a floor at the exact level is carried out automatically in the minimum time, irrespective of the operator. The stop may be initiated at any moment after passing a floor, when the correct stopping at the next floor will be automatically obtained.

Collective Automatic Control

Collective Automatic Control is a variation of the Automatic Push Button and is used for intensive service in buildings where it is desired to dispense with the services of an operator. The elevator is operated by the passengers themselves, who press buttons in the cars indicating the floors to which they wish to travel. Passengers on the floors call the car by means of pressing buttons indicating the direction in which they wish to travel. With this type of control, the elevator automatically answers all signals from waiting passengers in the direction in which it is travelling. This type of elevator may be installed for traffic conditions where it is desired to dispense with the operators, and car speeds up to 600 feet per minute are available under these conditions. Micro-levelling may also be supplied for any duties with this control, except the smaller capacities at slow speeds.

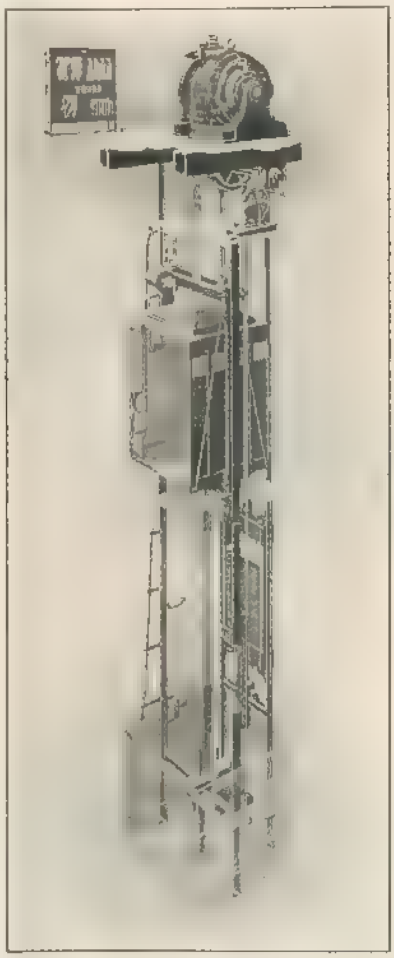

Illustration of Assembled Lift Equipment.

Automatic Signal Control

Automatic Signal Control, with which is combined Micro-levelling and Unit Multi-Voltage Operation, and Power-Operated Doors, provides the highest class of intensive service. The elevator is operated by means of buttons in the car to correspond to the floors served, and "up" and "down" buttons outside the hatchway at each floor. With this form of control, the attendant merely presses buttons in the car indicating the floors at which passengers wish to alight. When the attendant releases the hatchway doors in leaving the main floor, or in discharging and receiving passengers, at other floors, the doors close automatically, the car immediately starts automatically and runs to the next floor for which a button has been pressed, where it stops automatically, and the door opens automatically, this cycle being repeated for all floors for which there are passengers. Intending passengers press buttons on the floors, indicating the direction in which they wish to travel. This call is then registered directly on the controller of the first elevator travelling in the desired direction. This car then stops automatically at the floor.

Multi-Voltage Control

This employs a motor generator for supplying the current from the mains to the lift motor at the maximum rate without losses in starting resistances, etc. This type of control produces the fastest rate of acceleration and retardation, and without discomfort to the passengers. It permits higher car speeds, smoother operation; handles more passengers per hour, and consequently reduces the number of elevators required, and is economical in power consumption, and for busy lifts is economical in power consumption.

Multi-voltage control can be applied to most of the control systems described on this page.

AUXILIARY APPARATUS

Door Closers.—We are also offering various types of the appliances for the differing conditions for which they will be used.

Signal Equipment.—The Waygood-Otis Company is now offering Waygood-Otis Signals of all types, which are also distinctively Waygood-Otis in manufacture, embodying the same high standard of workmanship and materials as Waygood Otis Elevators. The design and operation of these Signals are the result of the thorough knowledge of the requirements of elevator service, and they are built to perform as an integral and co-ordinate part of the elevator and signal equipment.

Signal fixtures for both car and corridor are of new and artistic designs and finishes. The principal systems are the Hall Light and Car Signal System, and also the Hall Light and Car Annunciator Signal System. Additional features include scheduling devices, car position indicators, electrical and mechanical dial indicators and starters' panels.

Electric Door Operators.—Waygood-Otis Electric Door Operators are now available for the automatic operation of hatchway doors and are being extensively used in place of pneumatic door operating systems which have heretofore been exclusively used.

Electric Dumbwaiters are available in different forms of control, as required for various types of service. These machines are of a new and improved design, manufactured in Waygood Otis factories with all the care and precision used in the highest class of elevator machinery.

(Continued on next page)

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LIFT DESIGNING DATA

(FOR PRELIMINARY DESIGN ONLY)

General Consideration

In seeking to answer the frequent enquiry: "Given the dimension of the land and the number of stories, how many elevators, and of what capacity, will be required for this building?" experience shows that this presents quite an involved problem, which can only be referred to here in a general way, as it is not possible to formulate any hard and fast rules which would adequately cover all conditions encountered. It is frequently found on large installations that several alternative combinations of different equipments would give approximately equal service. The following data, therefore, is only approximate and should only be used when considering the problem in its early stages.

Number and Size

The number and size of elevators is governed by many considerations as: (1) character of building, (2) height of building, (3) rentable area, (4) average number and lengths of stops per trip, (5) speed and type of elevator used. The square feet of net rentable area per person in office buildings usually varies between 60 and 135—100 square feet is the usual density for an office building having a large number of small offices. For the allowable area of floor per person in factories, hospitals, assembly rooms, etc., consult the Board of Health Regulations.

The basis for deciding the car area is to allow two square feet per passenger and four square feet for attendant. Weight of passengers calculated at approximately 150 lbs. each. Cars should be arranged with the width greater than the depth to facilitate quick loading and unloading, and deep, narrow cars are objectionable at all times. A standard office building lift car is one of 2,500 pounds capacity, these passenger cars should be about five feet or a little less in depth. Minimum height of cars inside—seven feet.

Arrangement of Entrances, Hatchways, Motor Room

Two entrances and corner guides are to be avoided, if possible.

The type of door should be such that ingress and egress will be free as possible—usually 66 per cent. of the width of the car—in order to provide standing room for the attendant.

For automatic passenger lifts, single sliding doors, 2 ft. 9 in. wide, are usually fitted. These must be provided with glass or wire panel to give vision of car from landing.

When two or more lifts are placed side to side, wide cars result in the machines being spaced further apart, a very desirable position, particularly with large machine-room equipment.

Machine-rooms should be well ventilated, light, and clean as possible. Where machines have heavy parts which it may be necessary to remove from time to time for inspection, it is advisable to locate a beam with hand-hoist above them to facilitate handling.

Size of Motor Room

Motor-room sizes vary considerably according to the equipments to be accommodated, and the layout conditions of each installation must be considered separately. For each equipment, actual requirements should be obtained from the Lift Engineers, as this ensures adequate space being made available in the correct position. With gearless machines, a secondary floor over well-hole, four feet below main motor-room floor, is highly desirable and mostly essential. Overrun requirements are governed by the speed and are constant, as shown in the accompanying drawing.

SPEEDS

The following speeds of lifts are considered standard practice:—

Type of Service.	Speed in F.P.M.
Short rise, heavy goods hoists	60
Offices, warehouses, stores, five stories and under—not intensive service	200
Offices, warehouses, stores, five stories and under—intensive service	300
Flats up to five floors	125
Flats above five floors	250
Department stores, floor to floor service—slow service	200
Department stores, floor to floor service — intensive service	400
Offices, 6-8 floors intensive service	400
Offices, 8-12 floors—intensive service	600

LIST OF TYPICAL INSTALLATIONS

David Jones Ltd., Sydney. Associate Architects. H. E. Budden and E. H. Mackellar

Farmer & Co. Ltd., Sydney. Architects: Robertson & Marks Engineers: W. D. Watson & White.

Bank of N.S.W., Sydney. Architects Robertson & Marks Engineers: W. D. Watson & White.

Mark Foy's Ltd., Sydney. Architects: Ross & Rowe.

Government Savings Bank, Sydney Architects: Ross & Rowe.

"Herald" Building, Sydney. Architect: F. Clatworthy.

"Sun" Building, Sydney. Architect: J Kethel. Engineers: Julius Poole & Gibson.

T & G. Buildings, Sydney and Melbourne Architects: A. & K. Henderson.

Wingello House, Sydney. Architects: John Reid & Sons.

Murdochs' Ltd., Sydney. Architects: Power, Adam & Manning Engineer: H. A. Rorke.

Colonial Mutual Buildings, Sydney and Melbourne. Architects: Hennessy & Hennessy. Engineer. H. A. Rorke.

Science House, Sydney. Architects Peddle, Thorpe & Walker.

Stanton House, Sydney. Architect: H. E. White.

Hotel Alexander, Melbourne. Architect: Leslie M. Perrott.

National Bank, Melbourne. Architects: A. & K. Henderson.

Bank of Australasia, Melbourne. Architects: A. & K. Henderson.

A.P.A. Building, Melbourne. Architects: Moresby & Coates.

Howey Court, Melbourne. Architect. Marcus Barlow

The Strand, Melbourne. Architects: Peck & Kempter

Mutual Stores, Melbourne. Architect. Cedric H. Ballantyne.

Shell Building, Adelaide. Architects: McMichael & Harris.

State Bank, Adelaide. Architects: Davies, Wooldridge & Counsel.

Adelaide Electric Supply Co. Architects: McMichael & Harris.

Masonic Temple, Adelaide. Architects: Bruce & Harral.

T. & G. Building, Adelaide. Architects A. & K. Henderson.

Colonial Mutual Building, Brisbane. Architects. Hennessy & Hennessy. Engineer H. A. Rorke.

T. & G. Building, Brisbane. Architects: A. & K. Henderson.

Ascot Chambers, Brisbane. Architects: Hall & Prentice.

Alliance Assurance Co., Brisbane. Architect. J. A. Kethel.

Royal Exchange Assurance Co., Brisbane. Architect: J. A. Kethel

Bank of Australasia, Brisbane. Architects: A. & K. Henderson.

Commonwealth Bank, Brisbane. Architects: Commonwealth Works & Railways Department

Craigston Flats, Brisbane. Architects: Atkinson, Powell and Conrad.

Atcherley House, Brisbane. Architects. Atkinson, Powell and Conrad.

Heindorfs Ltd., Brisbane. Architect. E. P. Trowern.

McWhirter's Ltd., Brisbane. Architects: Hall & Phillips.

Yorkshire House, Perth. Architect: F. H. B. Hawkins.

Chennel House, Perth. Architects: Eales, Cohen & Bennett.

Royal Insurance Co., Perth. Architects: Hobbs, Smith & Forbes.

Goldsbrough, Mort & Co., Perth. Architects Hobbs, Smith & Forbes.

Bank of Adelaide, Perth. Architects: Hobbs, Smith & Forbes.

Goode, Durant & Co., Perth. Architects: Hobbs, Smith & Forbes.

(Continued on next page)

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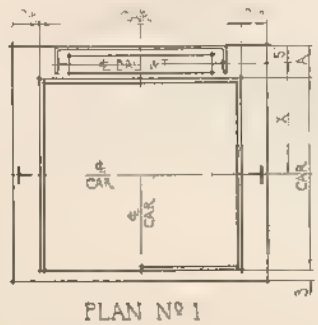
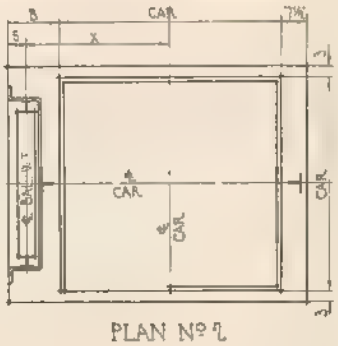


PLAN Nº 1



PLAN Nº 2

GEARLESS MACHINES

LOAD LBS.	SPEED FT. PER. MIN.	A: RISE UP TO 19.5'	A: RISE ABOVE 19.5'	B: RISE UP TO 19.5'	B: RISE ABOVE 19.5'	SPEED FT. PER. MIN.	C	E	D
UP TO 4000	350 AND OVER	14"	14"	19½"	19½"	350 - 400	9' 6"	8 0	16' 6
						450 - 500	10' 9"	8 0	17 6
						600	12 9	8 0	7 6"

GEARED MACHINES

LOAD LBS.	SPEED FT. PER. MIN	A: RISE UP TO 19.5	A: RISE ABOVE 19.5	B: RISE UP TO 19.5	B: RISE ABOVE 19.5'
UP TO 1000	UP TO 300	9"	14"	14½"	19½"
1001 - 3000	ALL SPEEDS.	11"	4"	16½"	19½"
ABOVE 3000	ALL SPEEDS.	14"	17"	19½	19½"

STANDARD LOAD LBS.	STANDARD DUTIES. SPEED FT. PER. MIN.	*	X	C: RISE UP TO 19.5	C: RISE ABOVE 19.5'	D	D'	E	F	G	H
1000	100		2'-6	4'-3"	–	11'-9"	13'-0"	7'-0"	11'-9"	12"	–
1500	125		2'-6	4'-9"	–	11'-9"	13'-0"	7'-0"	11'-9"	12"	–
1800	100		2'-6"	4'-3"	–	11'-9"	13'-0"	7'-0"	11'-9"	12"	–
2500	45		2'-6"	4'-3"	–	11'-9"	13'-0"	7'-0"	11'-9"	12"	–
4000	60		3'-0"	4'-3"	–	11'-9	13'-0"	7'-0	2'-0"	12"	–
5000	50		3'-0"	4'-3"	–	11'-9	13'-0"	7'-0"	2'-0"	12"	–
2000	125	A.C.	2'-9"	4'-9"	–	11'-9"	13'-0"	7'-0"	2'-0"	12"	
2500	100	A.C.	2'-9"	4'-3	–	11'-9"	13'-0"	7'-0"	2'-0"	12"	–
2500	150		3'-0"	4'-9"	–	11'-9"	13'-0"	7'-0"	2'-0"	2"	–
2000	200	A.C.	2'-9"	4'-9"	9'-6"	11'-9"	13'-0"	7'-0"	2'-0"	12"	–
2000	200	D.C.	3'-0"	4'-9"	9'-6"	11'-9"	13'-0"	7'-0"	2'-0"	12"	–
2000	250	D.C.	3'-0"	5'-3"	9'-6	12 9"	14'-0"	7'-0"	2'-0"	12"	–
2000	250	A.C.	3'-0"	5'-3"	9'-6"	13'-6"	14'-0"	7'-0"	2'-0"	18"	6
2500	300	A.C.	2'-9"	5'-3"	9'-6	13'-6	14'-0"	7'-0"	2'-0"	18"	6
2500	300	D.C.	3'-0"	5'-3"	9'-6"	13'-6"	14'-0"	7'-0"	2'-0"	18"	6
2000	300	A.C.	3' 0"	5'-3"	9'-6"	13'-6"	14'-0"	7'-0"	2'-0"	18"	6
2000	300	D.C.	3'-4"	5'-3"	9'-6"	13'-6"	14'-0"	7'-0"	2'-0"	18"	6"
2000	350		3'-4"	9'-0"	9'-6"	14'-6	5'-0"	7'-0"	2'-0"	18"	6"
2500	250	A.C.	3'-4"	5'-3"	9'-6	13'-6"	14'-0"	7'-0"	2'-0"	18"	6
2500	250	D.C.	3'-0"	5'-3	9'-6"	12'-9"	14'-0"	7'-0"	2'-0"	12"	–
2500	300	A.C.	3'-0"	5'-3	9'-6"	13 6	14'-0"	7'-0"	2'-0"	18	6"
2500	300	D.C.	3'-4"	5'-3	9'-6"	13'-6	14'-0"	7 0"	2'-0"	18	6"
3000	200	A.C.	3'-4"	4'-9	9'-6"	12'-6"	13'-0"	7'-0	2'-0"	18"	6"
3000	200	D.C.	3 0"	4'-9"	9'-6"	11'-9"	13'-0"	7'-0"	2'-0"	12"	–
4000	200		3'-4"	4'-9	9'-6	11'-9"	13'-0"	7'-0	2'-0"	2"	–
2500	400		3'-8"	9'-0	9'-6"	14'-6"	15'-0"	8'-0"	2'-0	18"	6"
3500	350		3'-4	9 0"	9'-6"	14'-6	15'-0"	8'-0"	2'-0	18"	6"

"X" INDICATES MAXIMUM DISTANCE BETWEEN CENTRE LINES OF CAR AND BALANCE WEIGHT WITHOUT USING A DIVERTING SHEAVE.

"F" INDICATES SPACE REQUIRED FOR DIVERTING SHEAVE WHEN "X" IS EXCEEDED

"G" INDICATES SPACE REQUIRED FOR PLAN Nº 1 WHEN NO DIVERTING SHEAVE IS USED.

H" INDICATES SPACE REQUIRED FOR PLAN Nº 2 WHEN NO DIVERTING SHEAVE IS USED.

* WHERE NO INDICATION IS GIVEN AS TO WHETHER A.C. OR D.C. SAME CONDITIONS APPLY FOR EITHER SUPPLY.

NO E OVER RUN DIMENSIONS C SHOULD BE CONFIRMED FOR EACH INSTALLATION AS PRESENT STATE REGULATIONS VARY

Waygood Otis

DIMENSIONS FOR PRELIMINARY DESIGN OF LIFT INSTALLATIONS

DRAWING Nº 1 8TH APR 31

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REGISTERED TRADE MARK

CHUBB'S AUSTRALIAN COMPANY LTD.

With Which is Incorporated

RICHARD BROTHERS

Art Metal Workers

164 CLARENCE STREET, SYDNEY. 120 QUEEN STREET, MELBOURNE

Works at ELIZABETH STREET, WATERLOO, SYDNEY

Agencies At:

BRISBANE: James Campbell & Sons Ltd. ADELAIDE: Burns, Philp & Co. Ltd.
PERTH: Harris, Scarfe & Sandovers Ltd. HOBART: Charles Davis Ltd
WELLINGTON, N.Z.: A. C. Gillies & Laird Ltd.

33g

S.A.A. File No.

MADE IN AUSTRALIA

PRODUCTS

Two-speed, Bi-parting, and Single Sliding Hollow Metal Lift Doors; Chubb Patent Lift Door Closers and Oil Checks, Pressed Metal Lift Cars, Hollow Metal Office Doors and Partitions; Pressed Metal Jambs, Architraves, and Skirtings; Wrought-iron Entrance Gates; Wrought-iron Balustrading; Collapsible Gates; Strongrooms; Safe Deposits; Reinforcements for Strongrooms; Strongroom Doors, Safes; Steel Grilles; Steel Shelving; Locks; Architectural Bronze Work; Bronze Entrance Doors.

Chubb's Two-speed Lift Doors give a wide opening for traffic, whilst effecting a definite economy of space in the Lift Well. The Doors require considerably less space in the recess than any other type, e.g., Two-speed Doors giving a traffic opening 4 ft. wide, slide back into a recess space of only 2 ft. 5¾ in., which accommodates Doors, Controller and Oil Check. See Drawings R 5371 page 3.

Hollow Metal Fire-resisting Doors are constructed with 18-gauge ingot iron base furniture steel, sleeved with solid cork, and all joints are interlocked and welded thus preventing any warping or twisting of doors, or breaking of joints. Doors are internally reinforced to stand up to heavy wear and tear.

The Unity Frame is specially designed to give a rigid and accurately balanced construction. It is a one-piece pressed steel unit, combining cabinet jambs, angle struts, sill track, and housing for door hanger, which ensures perfect alignment and balance of doors. With the Unity Frame construction the main supports are protected and relieved of excessive strain with no risk of fracture and the fixing becomes a simple matter.

CHUBB'S TWO-SPEED LIFT DOORS

The Chubb Patent Two-speed Flush Type Controller operates the doors with a smooth and silent action. The Controller has adjustments for regulating the speed and the Oil Check is also adjustable in the cushioning of the closing. There are no arms or obstructions projecting over the Lift Door thus permitting the door being flush with the hatchway.

Erection: Chubb's experienced mechanics carry out the erection of the equipment and in the event of the work having to be fixed by other contractors, full instructions are supplied for the adjusting and regulating of the doors and controllers.

All parts are made from selected high-grade materials, manufactured and assembled by expert tradesmen at CHUBB'S WORKS, WATERLOO SYDNEY

SPECIFICATION OF TWO-SPEED LIFT DOOR INSTALLATION

DOORS.—Chubb's Hollow Metal, Fire-Resisting Doors, with interlocked and welded joints, sleeved with slab cork, and internally reinforced to receive controller, hanger bolts, buffer stops, and bottom track guides. Design to be selected. (See Drawing No. R 5374 page 6.)

UNITY FRAME. Combining pressed metal 10-gauge cabinet jambs and trims; angle struts; overhead housing; rider plate and hinged apron encasing hanger, scribed lintel plate over doors; steel non-slip track and tread, 7 in. wide, all welded together as one unit. (See Drawing No. R 5371 page 3.)

HANGER.—Grant sleeved, ball-bearing, gearless, two-speed type, 3.

CONTROLLER.—Chubb's patent self-closing flush two speed Controller, fitted with Oil Check, and adjustments for closing speed. (See Drawing No. R. 5371, page 3.)

ALTERNATIVE CONTROLLER.—Chubb's self-closing, overlapping two-speed Controller, fitted with Oil Check, and adjustments for closing speed.

Note.—The doors will require to be set back 2 in. from the wall face to suit this Controller. (See Drawing No. R. 5372, page 4.)

BUFFERS. Two adjustable Buffers on closing side, and single adjustable Buffers on opening jamb.

GLAZING. Electro copper or other approved type. (For suggested designs, see Drawing R 5374, page 6.)

FINISH. Buffed, dipped, stoved and spray bronzed to selected tone.

LOCKS AND CONTACTS.—To be supplied by Lift Contractors, and fixed by Chubb's.

The Chubb Controller dispenses with Locks on Switch Control Lift Doors, but Locks are required on Dual Control Doors, for operation by the public.

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CHUBB'S BI-PARTING LIFT DOORS

MADE IN AUSTRALIA

Chubb's Bi-parting Lift Doors and Unity Frame are constructed on similar lines as described for the Two-speed Doors shown on page 1; but it will be noted that Bi-parting Doors require recesses on each side of the opening, and are suitable for openings not exceeding 3 ft. 6 in. wide. See Drawing No. R. 5373, page 5.

A great improvement has been made on the old type of Bi-Parting Doors by the introduction of a new Chubb patent device for the Interlock and Electrical Contact With this device, a comfortable Finger Grip is fitted in the meeting stile of the door, having an extension rod running through the stile to the top of the door, to which is fitted an Interlocking Link, with the Contact overhead.

The Finger Grip is flush, and there are no projecting links, such as a lock, thereby eliminating any risk of tearing of clothes.

The design of this Interlocking Link ensures a perfect contact and fool-proof interlock.

With this device, the Doors are mechanically locked before the control circuit is completed; and, conversely, when opening the doors, the control circuit shall be open before the doors are mechanically unlocked.

The Flush Interlock device dispenses with the loose cables travelling with the doors, and ensures the maximum of safety.

Another improved feature in Chubb's Bi-Parting Doors is a tubular rubber buffer running full height of doors, and fitted in extruded metal housings in the meeting stiles. This buffer cushions at the closing of doors.

The Bi-Parting Doors can be made self-closing by using Chubb's Patent Flush Controller. For this construction, see Drawing No. R. 5373, page 5

Erection

Chubb's experienced mechanics carry out the erection of the equipment, and in the event of the work having to be fixed by other contractors, full instructions are supplied for the adjusting and regulating of doors and controllers.

All parts are made from selected high-grade materials, manufactured and assembled by expert tradesmen at CHUBB'S WORKS, WATERLOO, SYDNEY.

SPECIFICATION OF BI-PARTING LIFT DOOR INSTALLATION

DOORS.—Chubb's Hollow Metal, Fire-Resisting Doors, with interlocked and welded joints; sleeved with slab cork, and internally reinforced to receive controller, hanger bolts, buffer stops, and bottom track guides. Design to be selected (See Drawing No. R. 5374, page 6.)

UNITY FRAME.—Combining pressed metal 10-gauge cabinet jambs and trims; angle struts; overhead housing; rider plate and hinged apron encasing hanger; lintel plate over doors; steel non-slip track and tread, 7 in. wide. All welded together as one unit. (See Drawing No. R. 5373, page 5.)

HANGER.—Grant sleeved ball-bearing, chain traction type, 5, on ball-race sheaves.

CONTROLLER.—Chubb's patent self-closing, flush controller, fitted with Oil Check, and adjustments for closing speed. (See Drawing No. R. 5373, page 5.)
Note.—This controller is only necessary for Dual Control Lifts.

BUFFERS.—Doors are fitted with extruded metal housings, full height, and have 1 in. tubular rubber buffer for cushioning the meeting of doors.

GLAZING Electro-copper, or other approved type. (For suggested designs, see Drawing No. R. 5374, page 6.)

FINISH.—Buffed, dipped, stoved, and spray-bronzed to selected tone.

ELECTRICAL CONTACT.—To be supplied by Lift Contractors, to suit Chubb's patent interlocking link.

CHUBB'S TWO-SPEED AND SINGLE LIFT DOORS, ALSO LIFT CARS

LIST OF PRINCIPAL INSTALLATIONS

NEW SOUTH WALES.

Commonwealth Bank Sydney Extensions to Head Office.
Government Savings Bank of N.S.W.
Commercial Banking Co. of Sydney.
Bank of N.S.W.
Commercial Bank of Australia Ltd.
Anthony Hordern's Ltd.
Farmer & Co. Ltd.
Beharfald's Ltd.
Mark Foy's Ltd.
Murdoch's Ltd
Gowing Bros. Ltd.
Hordern Bros. Ltd.
G.P.O., Sydney
Parliament House, Canberra.
Sydney "Morning Herald" Office.
"Sun" Office.
Stanton House.
Australia House.
Grace House.
Kyle House.
State Shopping Block.
St. James' Theatre Building
Agriculture Building
B.M.A. Building.
Town Hall, Sydney
Morris Hotel.
Masonic Club
Tattersall's Club.
City Tattersall's Club.
University Club.
T. & G. Insurance Co. Ltd.
Colonial Mutual Insurance Co. Ltd.
Yorkshire Insurance Co. Ltd.
Federal Mutual Insurance Co. Ltd.
Mercantile Mutual Insurance Co. Ltd.
Equitable Building Co.
Technical College.
Manly Hospital.
Kurri Kurri Hospital.
Newcastle Hospital.
Wollongong Hospital.
Marrickville Hospital.
Bathurst Hospital.

VICTORIA.

Commonwealth Bank, Melbourne.
E.S. & A. Bank, Melbourne.
Commercial Banking Co. of Sydney, Melbourne Office.
Union Bank, Melbourne.
National Bank, Geelong.
Town Hall, Melbourne.
Norman Bros., Melbourne.
Myers Building, Melbourne.
Alexander Smith Building, Melbourne.
Makower, McBeath Ltd., Melbourne.
Williamson's Theatre, Melbourne.
Athenaeum Club, Melbourne
Automobile Club, Melbourne.
A.P.A. Building Melbourne.
Equitable Building, Melbourne.
A.M.P. Building, Melbourne.
Equity Trustees Building, Melbourne.
Colonial Mutual Insurance Co., New Building, Melbourne.

QUEENSLAND.

Commonwealth Bank, Brisbane.
Treasury Building, Brisbane.
Town Hall, Brisbane.
T. & G. Building, Brisbane.
National Mutual Building, Brisbane.
Colonial Mutual Insurance Co., New Building, Brisbane.
Ascot Chambers, Brisbane.
Tattersall's Club, Brisbane.
Rowe's Building, Brisbane.
Globe Hotel, Brisbane.
Allan & Stark Ltd., Brisbane.
Brisbane Hospital.
Rockhampton Hospital.
Maryborough Hospital.

SOUTH AUSTRALIA.

Bank of Australasia Chambers, Adelaide.
G.P.O., Adelaide.
T. & G. Building, Adelaide.
National Mutual Building, Adelaide.
Works and Railways Dept., Adelaide.
Adelaide Hospital.

WEST AUSTRALIA.

Commonwealth Bank New Building Perth.
Royal Insurance Co., Perth.
Harris, Scarfe & Sandovers Ltd., Perth.

NEW ZEALAND.

National Bank, Wellington.
Dominion Building, Wellington.
"Evening Post" Building, Wellington.
Commercial Travellers' Club, Wellington.
Yorkshire Insurance Co., Auckland.

(Continued on next page)

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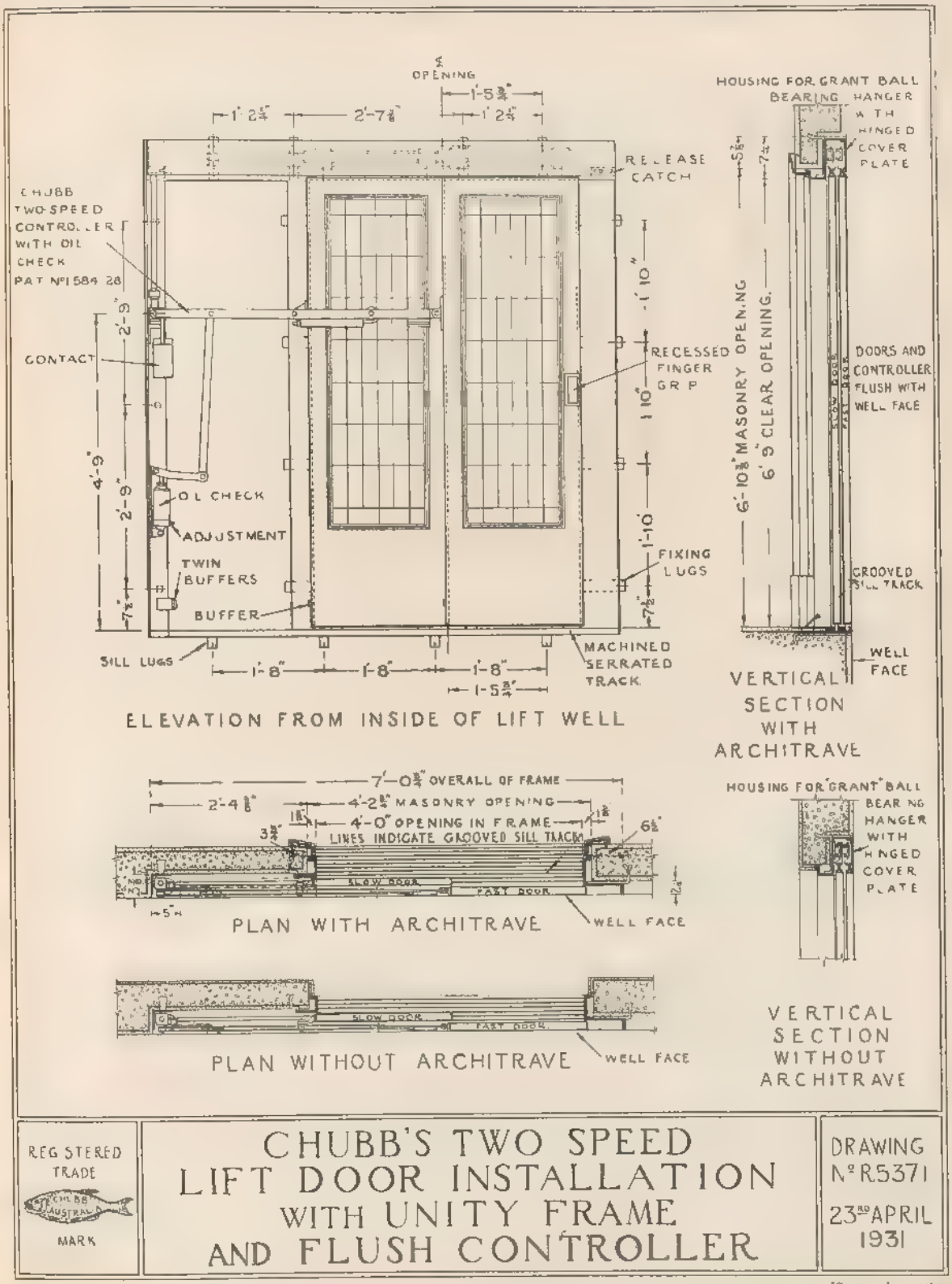

REGISTERED TRADE MARK

CHUBB'S TWO SPEED LIFT DOOR INSTALLATION WITH UNITY FRAME AND FLUSH CONTROLLER

DRAWING Nº R5371

23RD APRIL 1931

(Continued on next page)

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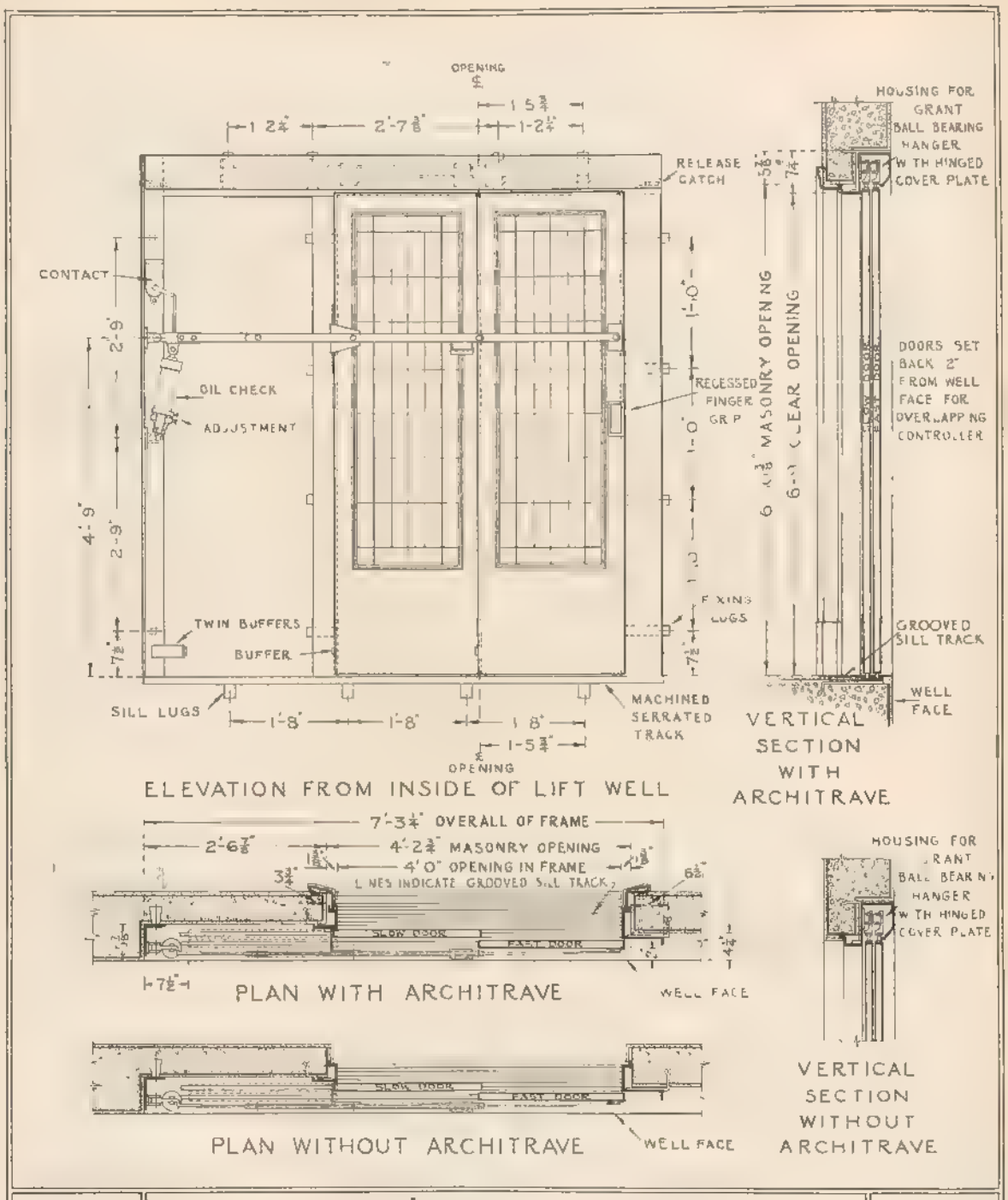


REGISTERED TRADE MARK

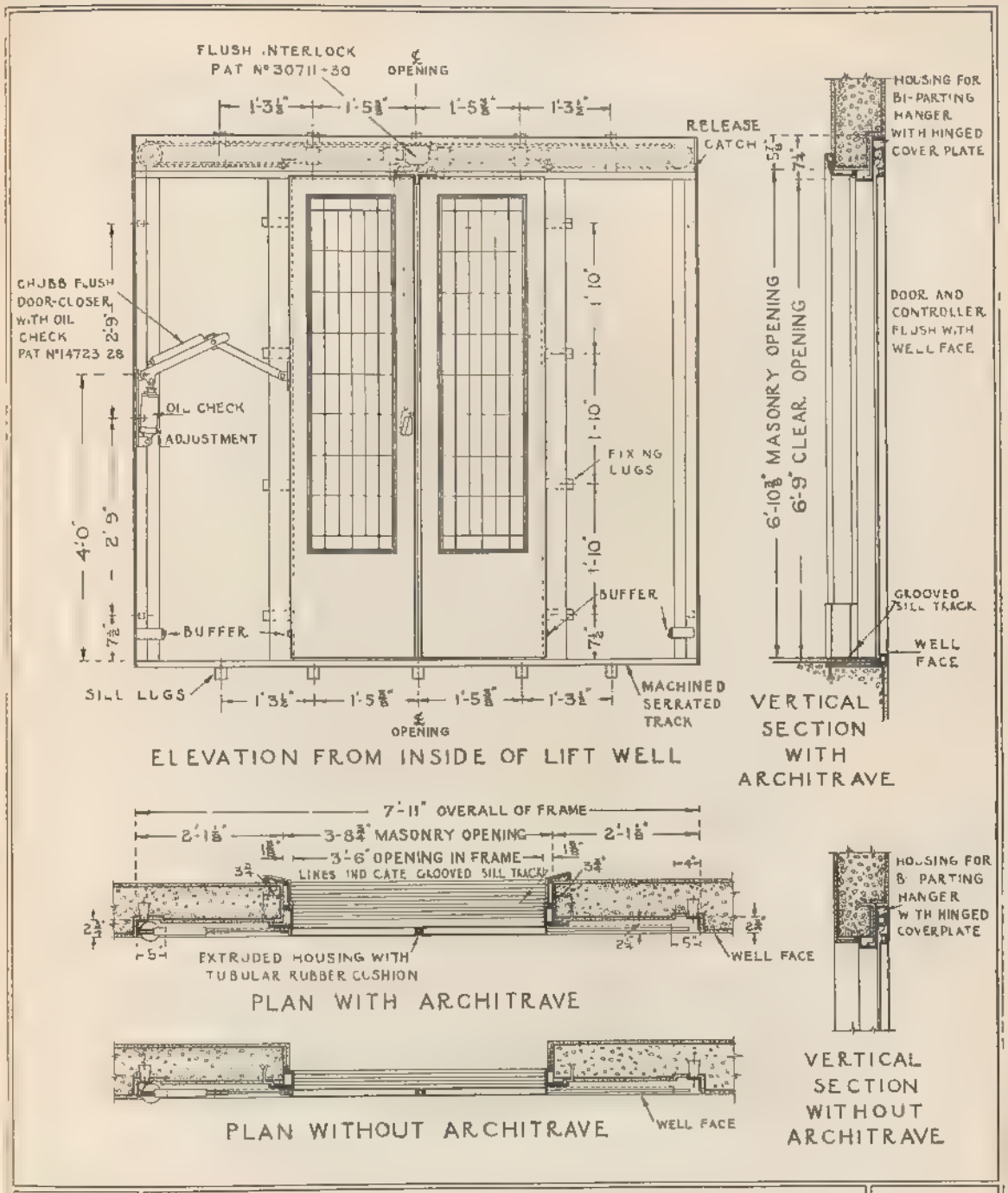
CHUBB'S TWO SPEED LIFT DOOR INSTALLATION WITH UNITY FRAME AND OVERLAPPING CONTROLLER

DRAWING Nº R5372

23rd APRIL 1931

(Continued on next page)

From the collections of Sydney Living Museums / Historic Houses Trust of NSW



REGISTERED TRADE MARK

CHUBB'S BI-PARTING LIFT DOOR INSTALLATION WITH UNITY FRAME AND FLUSH CONTROLLER

DRAWING Nº R5373

23RD APRIL 1931

(Continued on next page)

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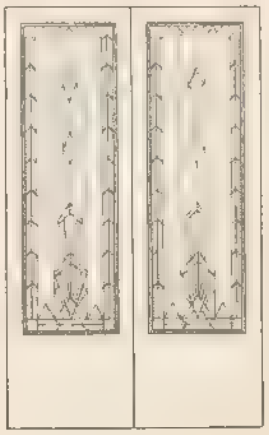

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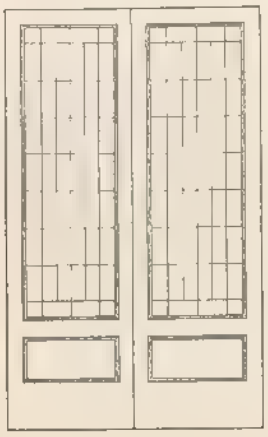

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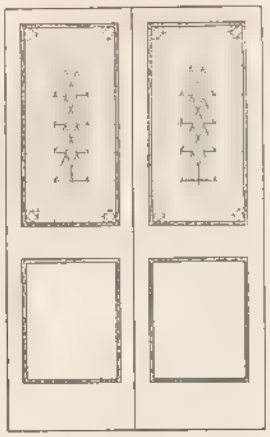
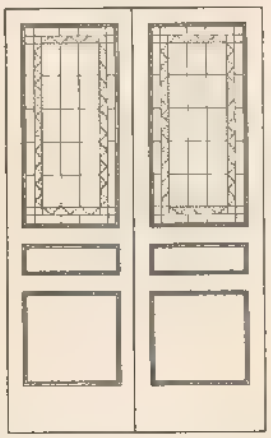


DESIGN Nº3

DESIGN Nº4

DESIGN Nº5



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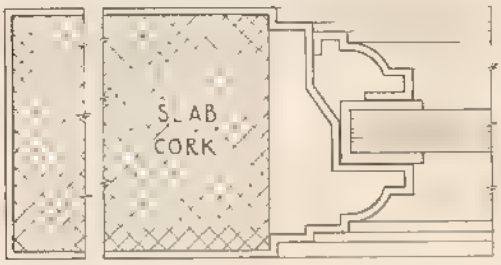

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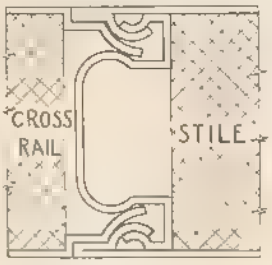

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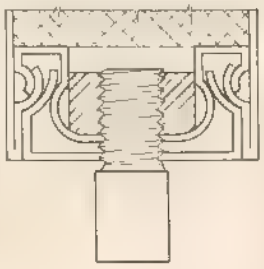

BOTTOM OF DOOR

REGISTERED TRADE MARK

CHUBB'S STANDARD TWO-SPEED AND BI-PARTING HOLLOW METAL FIRE RESISTING LIFT DOORS

DRAWING Nº R5374
23RD APRIL 193.

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REGISTERED TRADE MARK

CHUBB'S AUSTRALIAN COMPANY LTD.

With Which is Incorporated

RICHARD BROTHERS

Art Metal Workers

164 CLARENCE STREET, SYDNEY. 120 QUEEN STREET, MELBOURNE.
Works at ELIZABETH STREET, WATERLOO, SYDNEY.

Agencies At:
BRISBANE: James Campbell & Sons Ltd. ADELAIDE Burns, Philp & Co. Ltd.
PERTH: Harris, Scarfe & Sandovers Ltd. HOBART: Charles Davis Ltd.
WELLINGTON, N.Z.: A. C. Gillies & Laird Ltd.

33g

S.A.A. File No.

MADE IN AUSTRALIA

PRODUCTS

Two-speed, Bi-Parting, and Single Sliding Hollow Metal Lift Doors; Chubb Patent Lift Door Closers and Oil Checks; Pressed Metal Lift Cars; Hollow Metal Office Doors and Partitions; Pressed Metal Jambs, Architraves, and Skirtings; Wrought-Iron Entrance Gates; Wrought-Iron Balustrading; Collapsible Gates; Strongrooms; Safe Deposits; Reinforcements for Strongrooms; Strongroom Doors; Safes, Steel Grilles; Steel Shelving; Locks, Architectural Bronze Work, Bronze Entrance Doors.

SINGLE SLIDING HOLLOW METAL FIRE-RESISTING LIFT DOOR

Chubb's Single Sliding Hollow Metal Fire-resisting Lift Door is constructed with 18-gauge ingot iron base furniture steel, sleeved with slab cork, and all joints are interlocked and welded, thus preventing warping or twisting of door, or breaking of joints. Door is internally reinforced to stand up to heavy wear and tear.

The Unity Frame is specially designed to give a rigid and accurately balanced construction. It is a one-piece pressed steel unit, combining cabinet jambs angle strut, sill track, and housing for door hanger, which ensures perfect alignment and balance of door. With the Unity Frame construction, the masonry is protected and relieved of excessive strain, with no risk of fracture, and the fixing becomes a simple matter.

The Chubb Patent Flush Type Controller was principally introduced for Dual Control Lifts, and ensures the door being closed silently without damage to the lock. It entirely abolishes the irritations caused by the public leaving the doors open, and thus putting the Lift out of action.

CHUBB'S SINGLE SLIDING LIFT DOORS.

The old method of a gravity hung door resulted in noisy banging of locks, doors rebounding out of locks, fracturing of masonry, and Lift being put out of action through imperfect closing of doors. All these difficulties are overcome by the use of the Chubb Patent Controller.

Erection: Chubb's experienced mechanics carry out the erection of the equipment, and in the event of the work having to be fixed by other contractors, full instructions are supplied for the adjusting and regulating of doors and controllers.

All parts are made from selected high-grade materials, manufactured and assembled by expert tradesmen at CHUBB'S WORKS, WATERLOO, SYDNEY.

SPECIFICATION OF SINGLE SLIDING LIFT DOOR INSTALLATION

DOOR.—Chubb's Hollow Metal Fire-Resisting Door, with interlocked and welded joints, sleeved with slab cork, and internally reinforced to receive controller, hanger bolts, buffer stops and bottom track guides. Design to be selected. (See Drawing No. R. 5376, page 3.)

UNITY FRAME.—Combining pressed metal 10-gauge cabinet jambs and trims, angle strut, overhead housing rider plate and hinged apron encasing hanger; steel non-slip track and tread, 7 in. wide. All welded together as one unit. (See Drawing No. R. 5375, page 2.)

HANGER.—Grant sleeved, ball-bearing, type, 2.

CONTROLLER.—Chubb's patent self-closing, flush Controller, fitted with Oil Check and adjustments for closing speed. (See Drawing No. R. 5375, page 2.)

BUFFERS.—Adjustable Buffers on closing side, and on opening jamb.

GLAZING.—Electro-copper, or other approved type. (For suggested designs, see Drawing No. R. 5376, page 3.)

FINISH.—Buffed, dipped, stoved, and spray-bronzed to selected tone.

LOCKS AND CONTACTS.—To be supplied by Lift Contractors, and fixed by Chubb's.

(Continued on next page)

FOR LIST OF PRINCIPAL INSTALLATIONS, SEE PAGE 494

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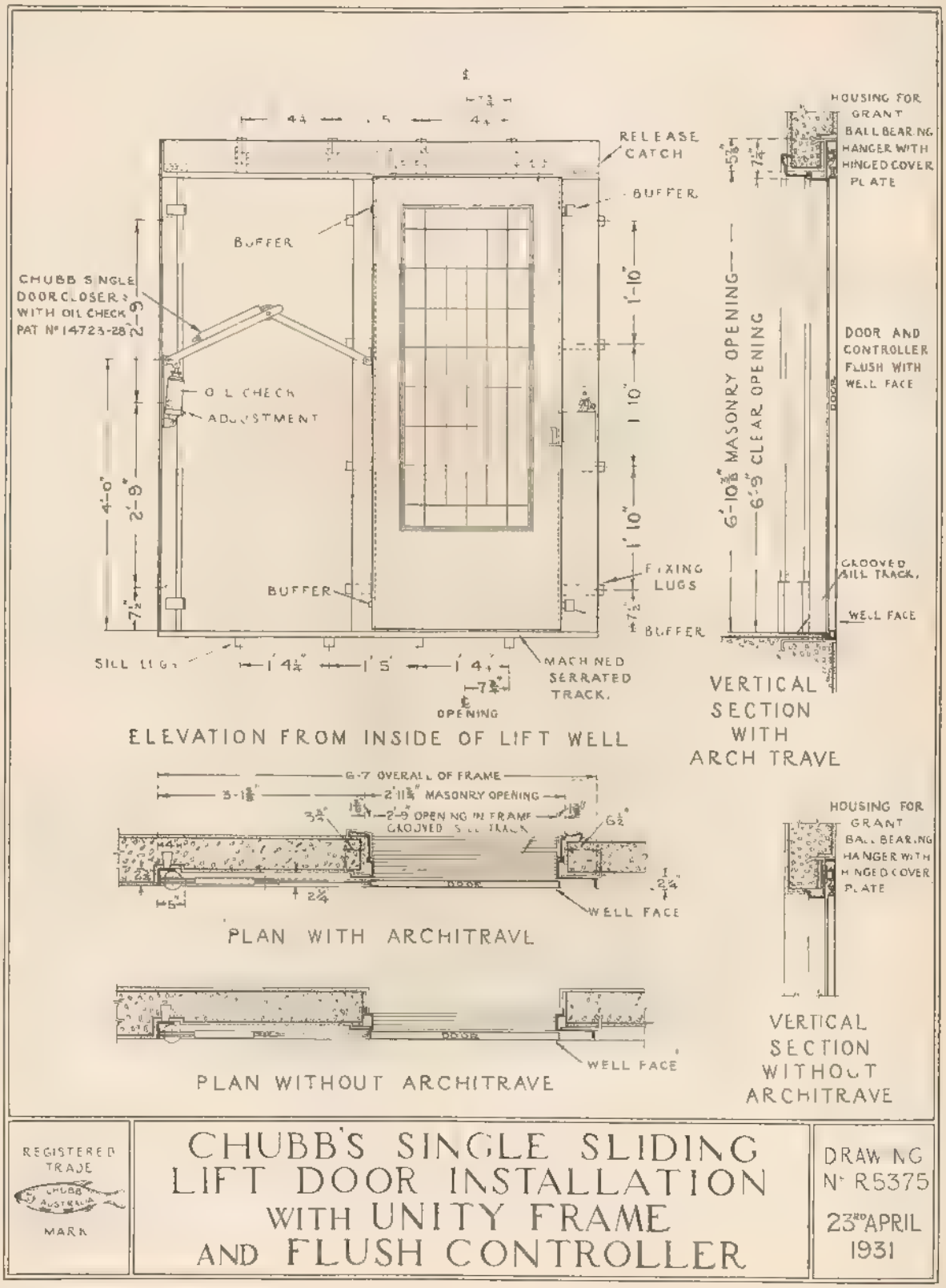

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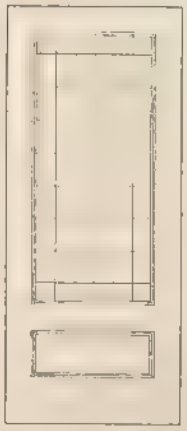
DESIGN Nº 1



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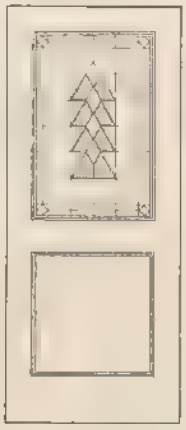

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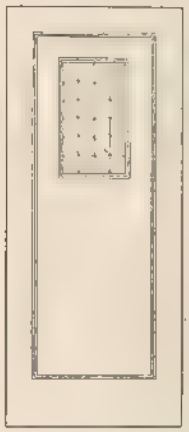

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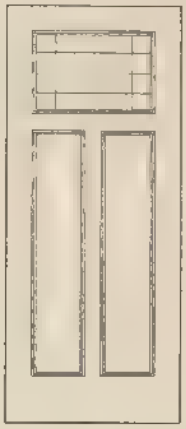

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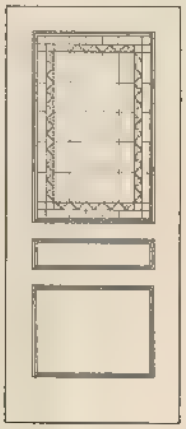
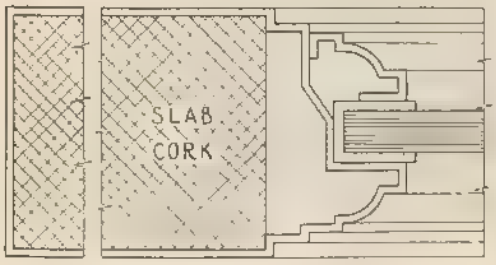
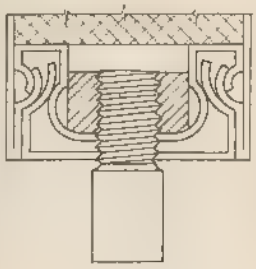


DESIGN Nº 6



SECTION THRº STILE

SECTION OF INTERLOCKED JOINT



BOTTOM OF DOOR

REGISTERED TRADE MARK

CHUBB'S STANDARD SINGLE HOLLOW METAL FIRE RESISTING LIFT DOORS

DRAWING Nº R5376
23RD APRIL 1931

(Continued on next page)

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

33g

S.A.A. File No.

CHUBB'S AUSTRALIAN COMPANY LTD.

With Which is Incorporated

RICHARD BROTHERS

Art Metal Workers

164 CLARENCE STREET, SYDNEY. 120 QUEEN STREET, MELBOURNE.
Works at ELIZABETH STREET, WATERLOO, SYDNEY.

Agencies At:
BRISBANE: James Campbell & Sons Ltd. ADELAIDE: Burns, Philp & Co. Ltd.
PERTH: Harris, Scarfe & Sandovers Ltd. HOBART: Charles Davis Ltd.
WELLINGTON, N.Z.: A. C. Gillies & Laird Ltd.

REGISTERED TRADE MARK

MADE IN AUSTRALIA

PRODUCTS

Two-speed, B.-Parting, and Single Sliding Hollow Metal Lift Doors, Chubb Patent Lift Door Closers and Oil Checks, Pressed Metal Lift Cars; Hollow Metal Office Doors and Partitions, Pressed Metal Jambs, Architraves, and Skirtings; Wrought-Iron Entrance Gates, Wrought-Iron Balustrading, Collapsible Gates, Strongrooms, Safe Deposits, Reinforcements for Strongrooms, Strongroom Doors; Safes; Steel Grilles; Steel Shelving; Locks; Architectural Bronze Work; Bronze Entrance Doors.

CHUBB'S PRESSED METAL LIFT CARS

Chubb's Pressed Metal Lift Cars are designed to give the minimum of weight, and the lightest possible materials are used throughout. The construction is a pressing and interlocking method, which ensures the maximum of strength and permanent rigidity.

The use of steel throughout makes the Cars fire-resisting, hygienic and vermin-proof.

Cars are constructed of ingot iron base rust-resisting furniture steel. The ornamental grillework panels are of aluminium alloy, and the plain panels are of pressed metal.

The body of Lift Car is of 14-gauge steel, reinforced by flanging and interlocking method, which dispenses with structural steel or other heavy materials. There are no visible joints.

CHUBB'S PRESSED METAL LIFT CAR.

Screws or rivets are not used on the inside face of bodywork or dome.

Mouldings are firmly clipped, and properly interlocked

Particular attention has been paid to the rigidity of the Car dome, to guard against deflection.

The roof is decked with 1 in. timber, and a manhole hinged flap is fitted for emergency purposes.

Ventilation. — A most important detail in the construction of a Lift Car is the ventilation, and provision is made in the dome and body of Chubb Lift Cars for grille panels to permit of correct ventilation.

In single shafts, Cars are fitted with hit-or-miss ventilators in the base, to take in the air with the travel, and the air is circulated as desired through the grilles in top panels and dome.

DESIGNS

On Drawing No. R. 5377, page 2, four standard designs of Lift Cars are shown

Design No. 1 is the pressed metal vertical and cross-rail construction

Design No. 2 is a pressed metal panelled construction.

Design No. 3 is plain, and similar in construction to No. 1.

Design No. 4 is a flush panel construction, specially suitable for hospitals and other institutions where the strictest hygienic conditions are imperative.

FINISH

All parts are made from selected high-grade materials, manufactured and assembled by expert tradesmen at CHUBB'S WORKS, WATERLOO, SYDNEY

Cars are buffed, stoved and spray-bronzed in selected tone.

Special grained finishes, to give high-class wood effects, can be executed if required

For List of Principal Installations, See page 494

(Continued on next page)

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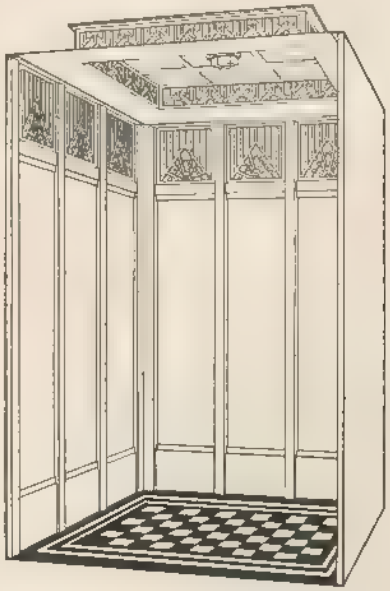
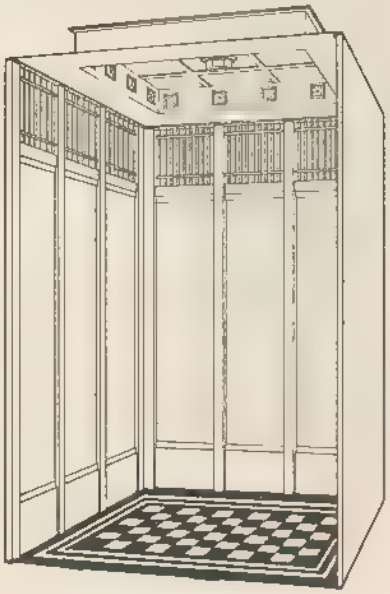


DESIGN Nº 1

DESIGN Nº 2



DESIGN Nº 3

DESIGN Nº 4

REGISTERED TRADE MARK

CHUBB'S STANDARD LIGHT WEIGHT PRESSED-METAL LIFT CARS

DRAWING Nº R5377
23RD APRIL 1931

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

33g

S A A File No

AUSTRALIAN METAL PRODUCTS PTY. LTD.

GENERAL OFFICE AND PLANT:
REAR NICHOLSON & SCOTCHMER STREETS
FITZROY, VICTORIA

Interstate Distributors:

SYDNEY—H. E. McClelland, 55 York Street
ADELAIDE—Messrs. George Wills & Co. Ltd., 31 Grenfell Street
BRISBANE—Messrs Bernays & Anderson, 125 Adelaide Street
PERTH—Messrs. George Wills & Co. Ltd., 156 St. George's Terrace

"DOWELL"

[For Other Products See Index]

Products

"Dowell" Hollow Metal Fire-resisting Elevator Doors. "Dowell" Unity Elevator Door Frames. Elevator Entrance Fronts Elevator Cars.

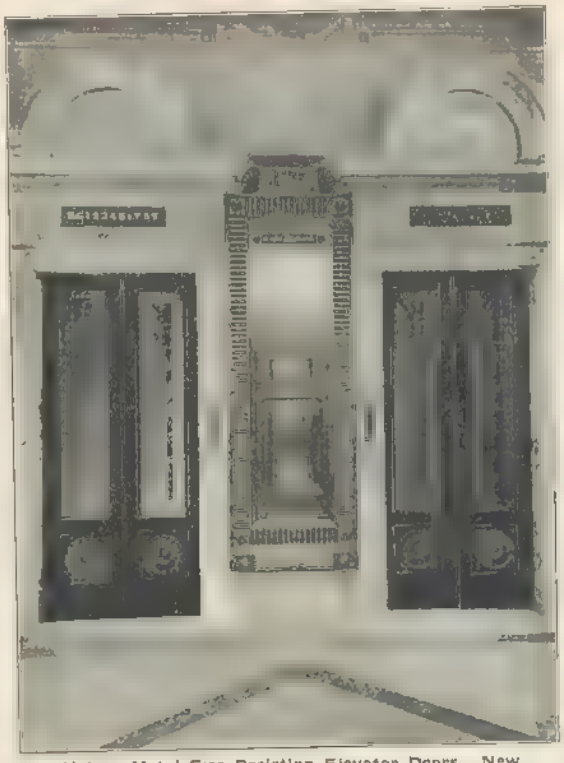
Elevator Doors

are made of 18 gauge ingot base furniture steel pressed to shape and rolled to give sharp arrises. They are lined with slab cork to avoid metallic ring. All joints are reinforced, welded and finished flush, with no possibility of broken joints. Where necessary, doors are reinforced to take hangers, closers, locks, etc.

These doors have been tested and accepted by the Fire Underwriters' Association of Australia, and can be made to suit any architectural design required.

Unity Frame

These elevator door frames are made of 10 gauge steel pressed to shape in one piece, welded together and made integral. They combine cabinet jamb, sill, track, hanger housing and angle struts, and assure accurate alignment and smooth running of doors. They are built in with the masonry walls, and all the strain of operation of doors evolves on the frame, with no risk of fracture to the walls. The fixing of doors is simplified, as the necessary drilling, etc., is done in the workshop. Non-slip treads are provided on thresholds and rubber buffers where necessary. A hinged apron plate over the hanger serves the dual purpose of flushing the well and as a dust cover.



Hollow Metal Fire-Resisting Elevator Doors. New Harbour Trust Building, Melbourne.
Architects: Sydney Smith, Ogg & Serpell

Elevator Fronts

Elevator entrances and fronts should be complete in every detail under one contract to ensure perfect operation and to simplify responsibility.

Hangers and Closers

Doors and frames are prepared for "Rollsway" Hangers (or other approved type) and "Rollsway" Closers are recommended. "Rollsway" door hangers and closers offer really high-grade and trouble-free service. The hangers are self-aligning, self-adjusting for any wear, and are self-cleaning. The closers are adjustable both for the speed of closing and also for the duration of the checking period. Large oil check cylinders ensure easy adjustment and consistent operation during variations in temperature.

Erection

All doors and frames are erected and fixed in position by our experienced workmen, but if required they can be fixed by others, in which case all necessary instruction and details are provided to ensure correct installation.

Finish

All doors and external faces of frames are finished in high-grade lacquer in selected tones. Undercoats are baked on, thus giving an impervious and lasting finish.

SPECIFICATION

Doors shall be "Dowell" Hollow-metal Fire-resisting doors made of 18 Gauge Furniture Steel, as accepted by the Fire Underwriters' Association of Australia, locked, welded and filled with slab cork; reinforced as required to take hangers, closers, etc. Doors shall be (single-speed) or (two-speed) or (Bi-parting) as shown on plan. Design to be selected.

UNITY FRAMES shall be made of 10 Gauge Pressed Steel welded together, combining cabinet jambs and trim, hanger housing, hinged apron, angle struts lead-filled treads, and buffers as required.

HANGERS shall be "Rollsway" ball-bearing or other approved type.

CLOSERS shall be "Rollsway" or other approved type.

FINISH.—All metal to be thoroughly sanded, washed with benzine, filled, primed (baked on), and finished in high-grade lacquer to selected tone.

GLAZING shall be electro-copper to design to be selected.

FIXING.—Doors and frames to be supplied and installed by Australian Metal Products Pty. Ltd., but masonry walls shall be built by the general contractor after the frames are stood in position.

(Continued on next page)

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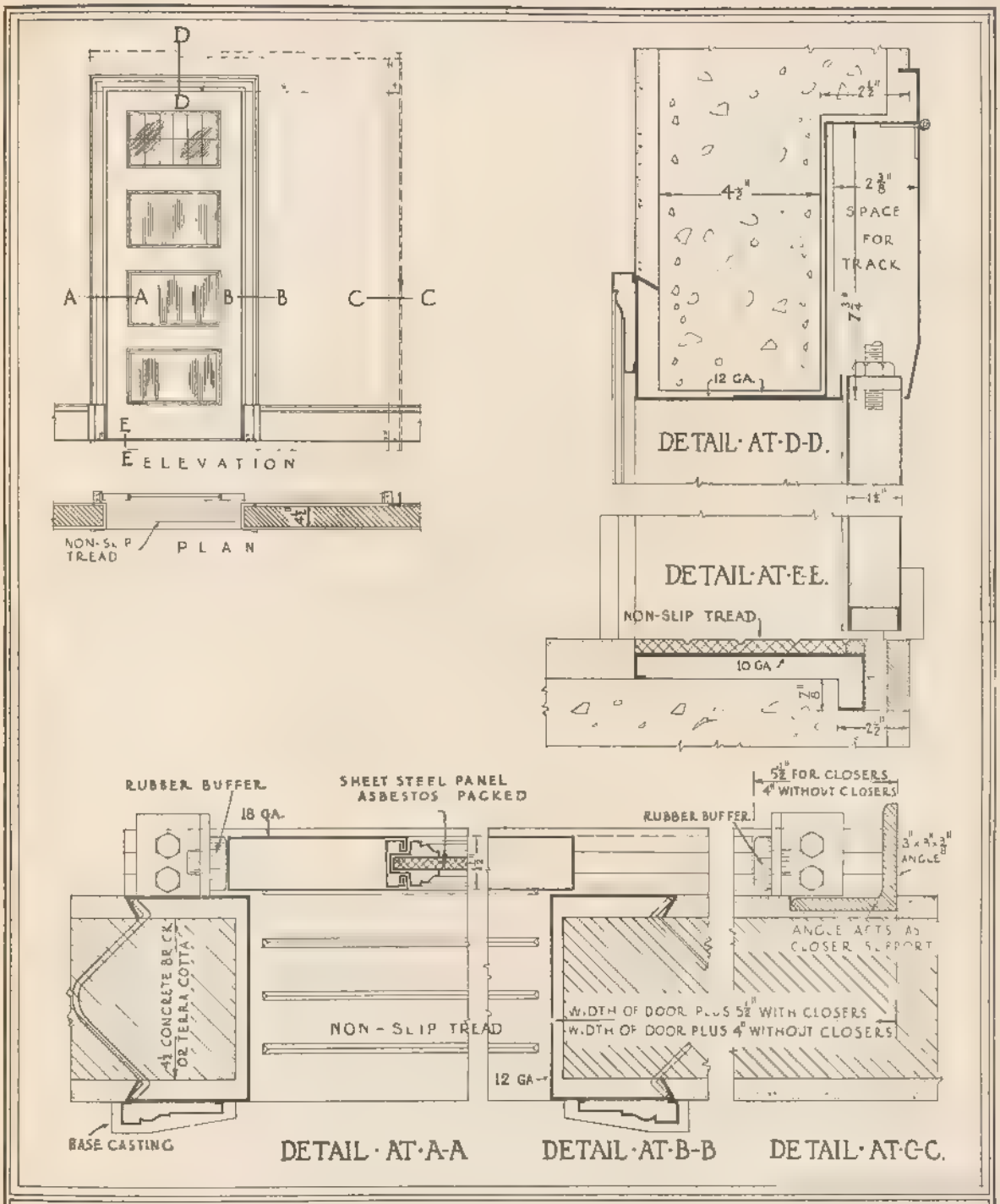

DETAILS OF "DOWELL" HOLLOW METAL, SINGLE SLIDING LIFT DOOR, AND PRESSED METAL FRAME.

SCALE 0 1 2 3 4 INCHES

(Continued on next page)

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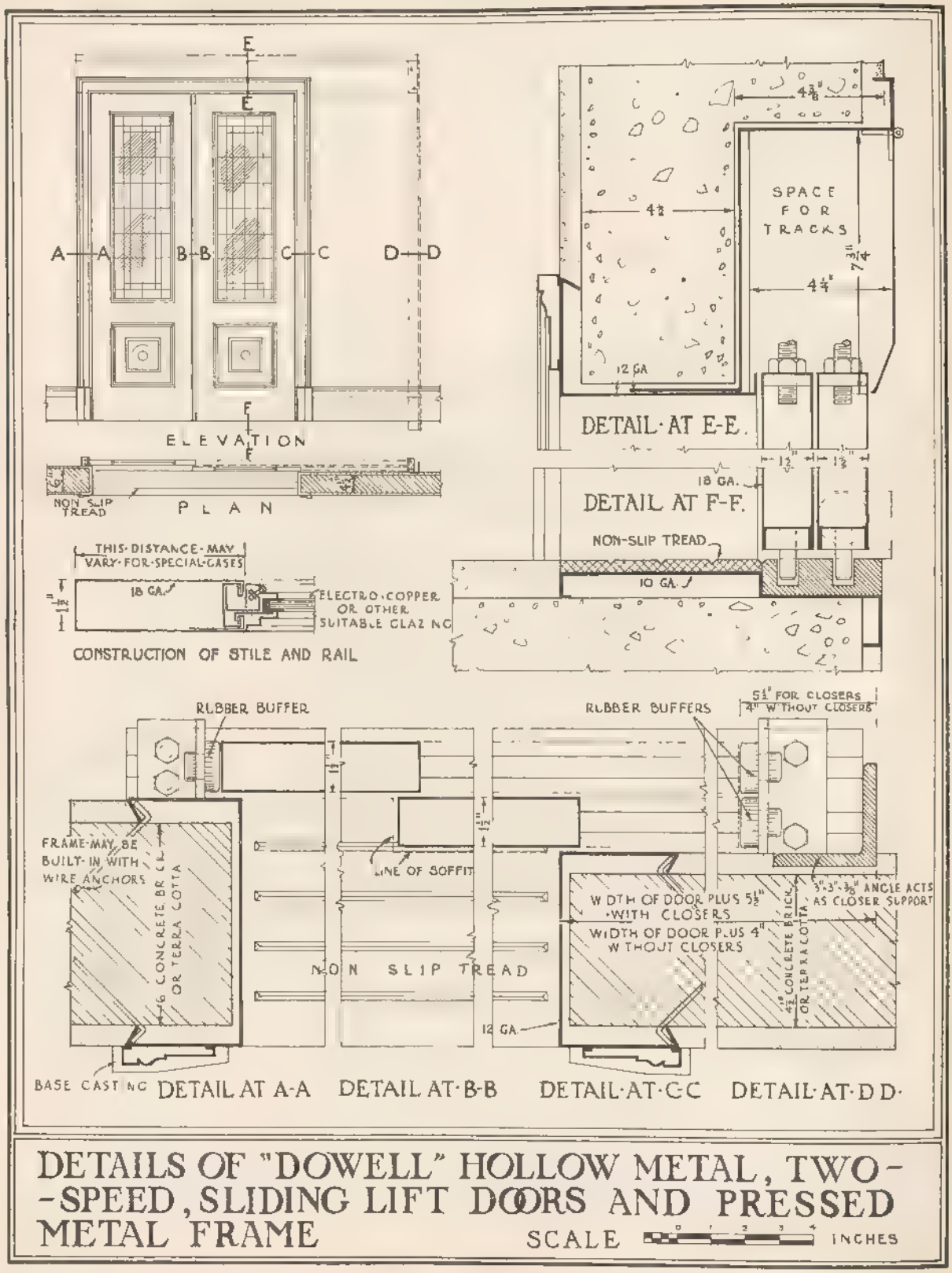

DETAILS OF "DOWELL" HOLLOW METAL, TWO-SPEED, SLIDING LIFT DOORS AND PRESSED METAL FRAME

SCALE 0 1 2 3 4 INCHES

(Continued on next page)

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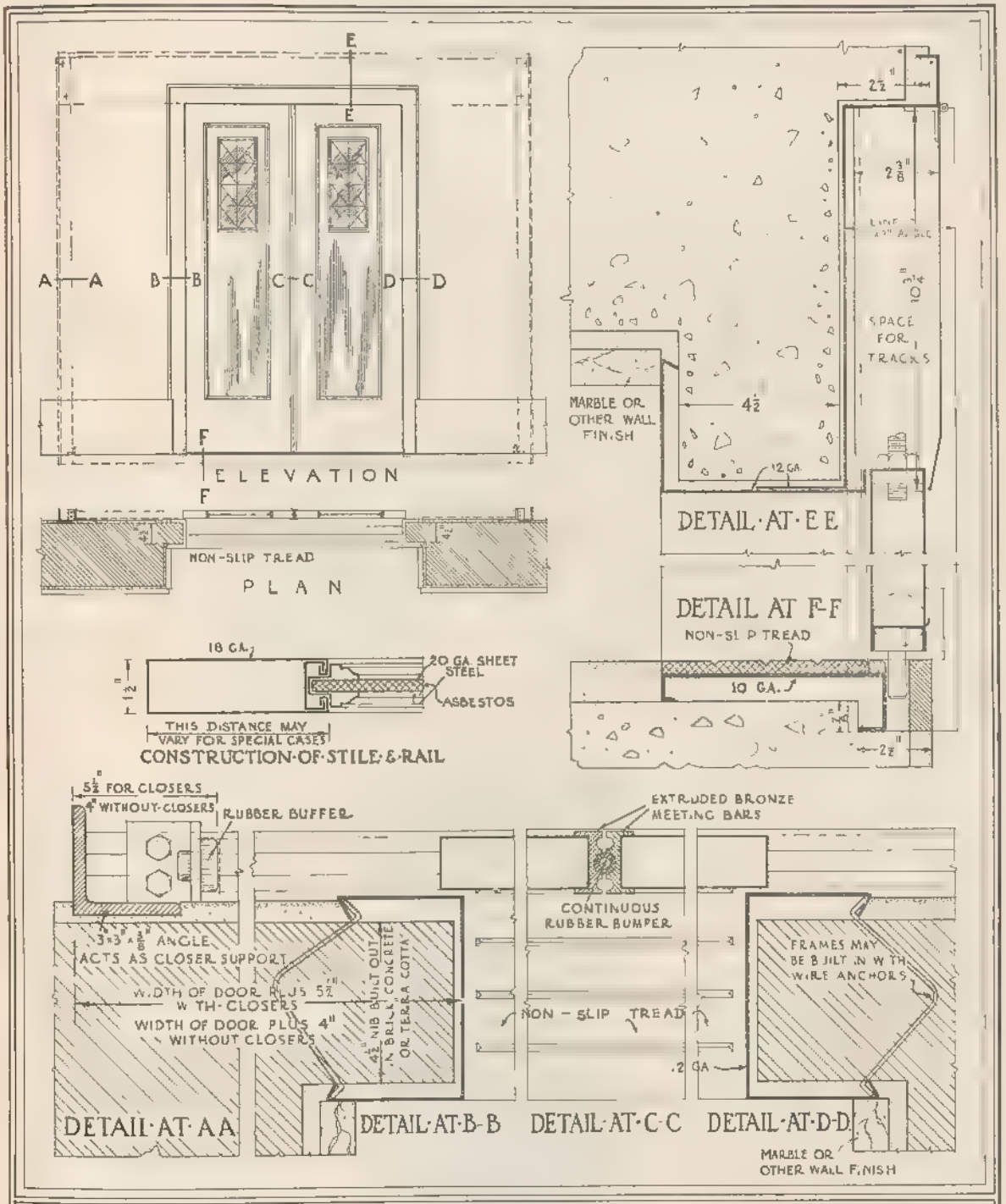

DETAILS OF "DOWELL" HOLLOW METAL, BI-PARTING LIFT DOORS AND PRESSED METAL FRAME

SCALE. 0 1 2 3 4 INCHES.

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33g S.A.A. File No.	BROOKS, ROBINSON PTY. LTD. ELIZABETH STREET, MELBOURNE WORKS: MAFFRA STREET, SOUTH MELBOURNE *Telephone M 3131 (5 lines)*	B-R

[For Other Products, See Index]

LIFT DOOR AND ELEVATOR CONSTRUCTION

Modern Requirements

The steady improvement in the construction of high-powered Elevator machinery and equipment has necessitated much thought on the part of Metal Craftsmen to provide cars, doors, surrounds and indicators to be in keeping with and fulfil the efficient service demanded of these "modern cars in vertical streets."

Application of Metal to Lifts, Doors and Cars

After the necessary machinery has been installed by the lift contractors, the metal craftsman is required to confine his attention to the actual door openings and cars. The use of metal has solved the problem as far as providing a serviceable and aesthetic article.

Almost any design (ornamental or plain) becomes practicable; but taking everything into account, there is no doubt that the use of metal sheathed mouldings as framing with 16 gauge sheet metal panels is the best. It has the advantage of being light in construction and has not the shallow metallic ring of hollow metal section cages. They are sound absorbing and there fore comfortable.

Dimensions of Cars and Doors

The size of the car depends on the number required to serve a given area, their speed and so on, which are usually determined by the architect; the usual size being on an average 5 ft. 6 in. x 5 ft 6 in. or 6 ft. x 5 ft. 6 in for office buildings with a single sliding door in an opening which should be not less than 2 ft 6 in wide and 6 ft. 8 in. high.

Large shops and departmental stores and hotels require much larger cars—10 ft. x 6 ft. and 7 ft. x 6 ft. are not uncommon As much door-opening as possible should be provided. The use of bi-parting two-speed and three-speed doors are a solution to this problem.

Lift Doorways

There are various methods of treating the door openings Regulations require the jambs to be solid, and to ensure this a frame of 5 in x 2½ in. channel section, with rider plate to carry track, is built in as the concreting proceeds. On this steelwork any other jamb and architrave treatment may be fixed Methods of finishing doorways are as follows:—

1. Drawn metal sheathed mouldings, one section being for the jamb lining and the other section for the architrave. This is the best method, as any desired section may be given, the angles of members of all mouldings being clean and sharp.
2. Very often 2-inch angle irons are used as frames. With this method, by fixing an additional small angle on the outside edge of wall, a sheet metal panel may be fixed at the backs of these angles, and so forms the jamb and soffit lining. This method is not quite satisfactory owing to the wide area of sheet metal and is used in a cheaper class of construction.
3. A combination of the above methods is the use of a folded channel section of heavy gauge metal, which serves the dual purpose of being serviceable (taking the place of the channel back) and forming the soffit lining. The architrave may be of similar material. This method is very serviceable, but all angles are rounded and makes the sections rather limited in design.

Lift Doorway,
Bank of Australasia, Collins Street, Melbourne.

"Luxfer" Fire Resisting Lift Doors

The patent "Luxfer" Fire-resisting Lift Door as is now universally adopted throughout Australia, is the outcome of much thought and experiment on the part of Brooks, Robinson Pty. Ltd., who are pioneers of this class of metal work and construction. Needless to say that this door has stood up to the most exacting and rigid tests and is passed by the M.C.C. for use in buildings in one occupancy such as office buildings, etc. The door is light in weight and durable in construction. The use of beads and solder of any description is entirely eliminated

The panel is glazed with "Luxfer" Fire-resisting glazing, the glass is ¼ in. in thickness, and only the strips of copper are used to frame each piece of glass which must not exceed 16 square in in area, and one panel only to each door must not exceed 5 square ft in area

The illustration shows the highly ornamental type of work that can be produced not only in the actual metal work, but also in the "Luxfer" glazing where cast ornament has been introduced as a surface decoration

(Continued on next page)

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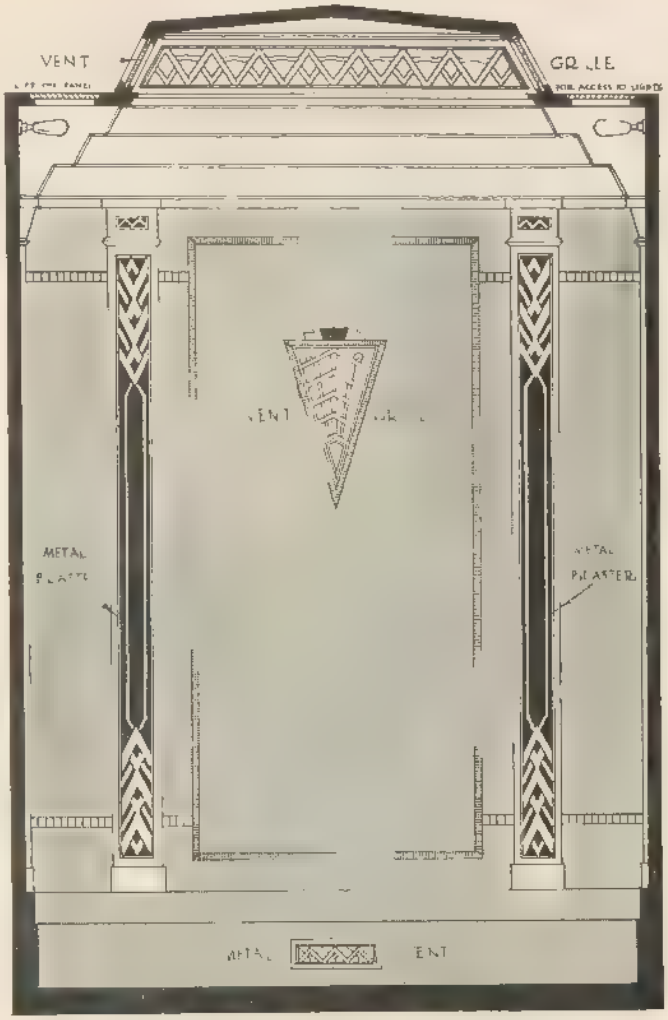
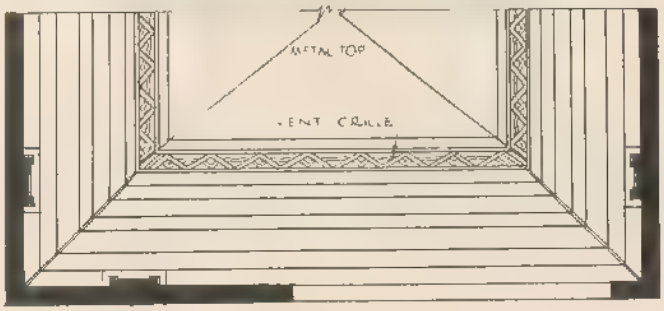


SECTION THRO LIFT CAR



PLAN OF CEILING

Brooks, Robinson Pty Ltd.	DESIGN FOR LIFT CAR IN METAL	DRG Nº 1

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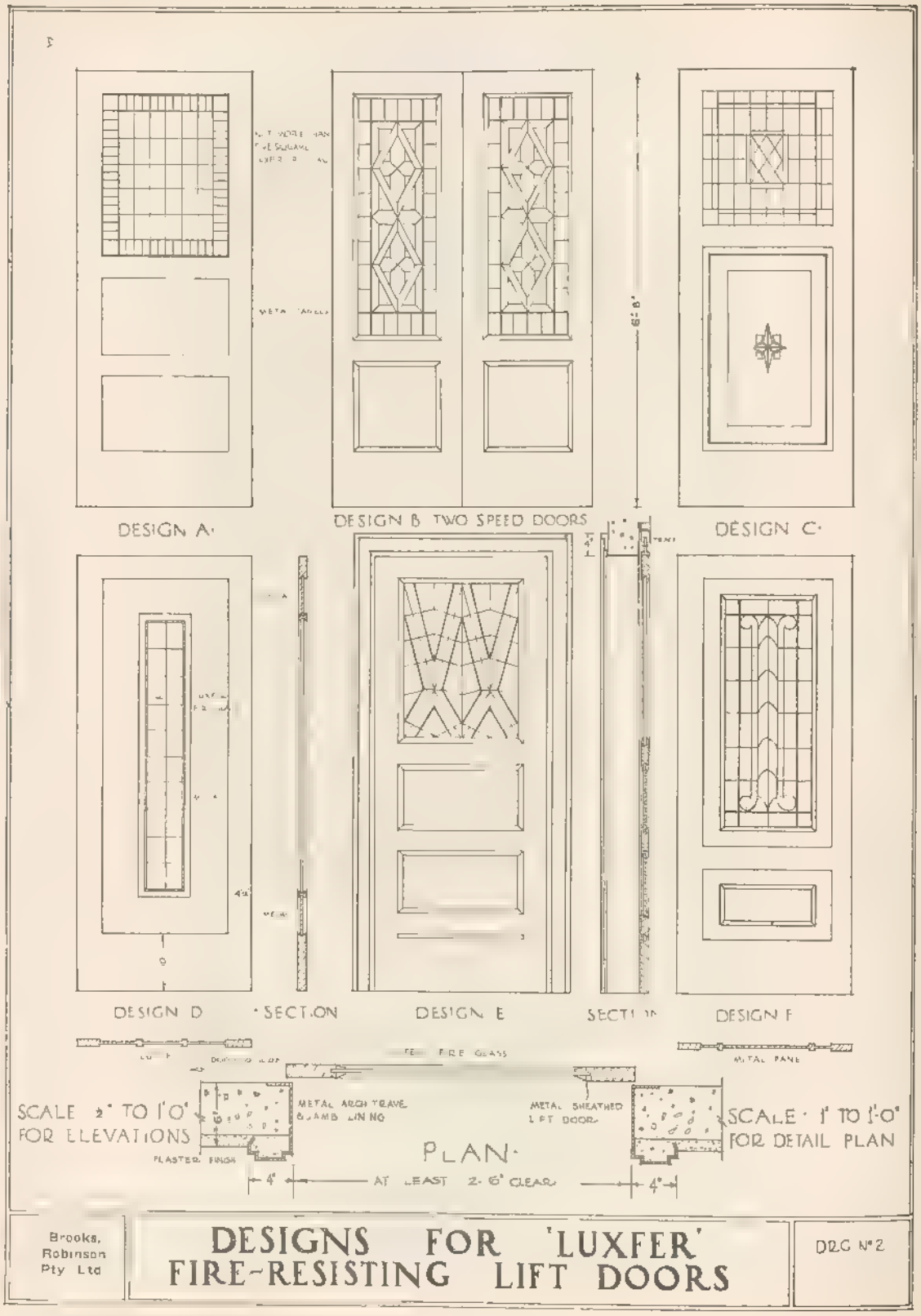

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SECTION U

[Containing S.A.A. Filing Sections Nos. 35 and 36]

EQUIPMENT

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35c&k

S.A.A. File No.

MONEL METAL

A PRODUCT OF THE INTERNATIONAL NICKEL CO. INC.

AUSTRALIAN DISTRIBUTORS:

FERRIER & DICKINSON LTD., 26 CLARENCE STREET, SYDNEY.

VICTORIA AND TASMANIA:
H. Perks & Co. Pty. Ltd.,
31 Queen Street, Melbourne, C.1

SOUTH AUSTRALIA:
Alwin Fisher Ltd.,
17 Flinders Street, Adelaide.

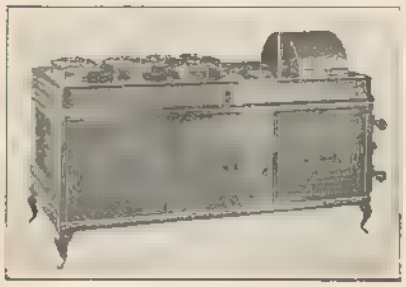
QUEENSLAND:
W. E. Peterman,
160 Edward Street, Brisbane.

WESTERN AUSTRALIA.
Harris, Scarfe & Sandovers Ltd.,
Hay Street, Perth.

INCO MONEL METAL

Cafeteria Equipment

The primary consideration in fitting a cafeteria must be to provide equipment that will withstand hard wear and rough treatment, and at the same time that will appeal to customers by a clean and attractive appearance. Monel Metal is the obvious solution to this problem. Bain Maries, sinks serving counters, work counters, utensils, trays, food cabinets, drawers, steam tables, plate racks, all give utmost service combined with beauty and healthful cleanliness when made of Monel Metal.



The sanitary qualities of Monel Metal, combined with steel-like strength, are necessary in the construction of this Bain Marie.

Steam Tables

Steam tables in restaurant, hotel, and [illegible] kitchens constructed of Monel Metal give maximum service, and make [illegible] usually strictly utilitarian fitting [illegible] of an ornament. The kitchen [illegible] appreciates the cheering effect of [illegible] Monel Metal surfaces, their sanitary, non-corrosive properties are an appreciable aid to efficiency.

Laundry Equipment

Monel Metal has given many years of proved service. Whether on the basis of low yearly capital cost, economy in upkeep, or proved suitability for the desired service, the superlative merits of Monel Metal equipment are abundantly justified.

Monel Metal has amply proved it possesses adequate strength, and the ability to resist washing solutions, scours and bleaches. It possesses a permanently smooth mirror-like surface, which improves with continuous use, and is therefore a safe and reliable metal against delicate fabrics.

The various uses of Monel Metal include washers, extractors, trucks, chutes, starching equipment, ironers, etc.

Monel Metal Fabrication

The fabrication of Monel Metal from the raw material into its various made up forms is the work of skilled sheet metal workers.

Lists of firms in each State who are especially competent to work in Monel Metal will be forwarded on request to the Agent.

Kitchen Equipment

Monel Metal is unsurpassed in kitchen equipment for continuous wear. It may be used for drain boards, laundry chutes, cabinet tops and fittings, range hoods, oven linings, plate warmers, shelf linings, wall protectors, drawer linings and refrigerator finishings.

Sinks

Monel Metal Sinks are sanitary, and rustproof, not affected by hot utensils or dishes. Drain boards may be either fluted or smooth. They are strong and consequently not easily damaged by blows from heavy pots and pans.

The tough, non rusting qualities of Monel Metal will withstand the rough wear and tear of a lifetime in this Dish Washer.

Dish Washers

Monel Metal in and on dish-washers is the outward and visible sign of the inward and actual cleanliness. It is the logical metal for the dish-washing machine, being rustless and free from verdigris. The appearance of such a Monel machine gives the finishing touch to the up to-date Monel kitchen.

Special Applications

In recent years Monel Metal has been found to serve in many unusual plans, and the possibilities of its application are unlimited. The agents will be pleased to co-operate with the architect or engineer in the study of special applications of this metal.

Engineering Applications

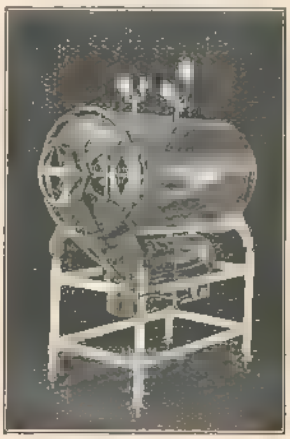
Monel Metal has been successfully used as pump rods, valves, liners, impellers, motor boat shafting, keel bolts, propellers, tank linings, etc.

Literature Available

If you are interested in any particular application, a copy of available literature will be forwarded on request to the Agent.

Monel Metal Hospital Equipment

The first Monel Metal installations were made over twenty-three years ago, and, after this long period of time in service under the most severe conditions, are still functioning perfectly with every indication pointing to indefinite life. For this reason, the demand for Monel Metal equipment has been steadily growing. The last figures available show that in 1929 there were 569 Hospitals equipped with Monel Metal.



Monel Metal is used in this Sterilizer because it is a sanitary metal and will withstand the rough wear.

Because no other metal has such an outstanding record, Monel Metal has become recognised as the ideal material, and should be specified for surfaces, finishes and fittings, such as for clinical cabinets, obstetrical beds, dietary cabinets, built-in cabinets, portable cabinets, mortuary refrigerators, laboratory sinks and tables, utensil racks, sterilizers, instrument, operating and bedside tables, etc.

Sterilizers

Sterilizers, both standard (as illustrated) and built-in to walls, are decidedly improved by the use of Monel Metal in their construction, which is maintained scrupulously clean and lustrous with a minimum of effort, and resists heat far beyond requirements of sterilizers. In hospitals where the sterilizers are built-in, the whole surface of one wall is covered with Monel Metal, and the openings for the various sterilizers, which are themselves lined and equipped with Monel Metal trays, are let into this surface. The standard sterilizers are used more frequently in smaller operating theatres.

Basins and Utensils

Monel Metal Hospital basins and utensils last many times as long as any other, and so reduce replacement costs to a fraction. They won't rust, chip or peel, they resist corrosion, and are absolutely sanitary.

[*See pages 325-326 for physical properties and other information on Monel Metal*]

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"ATHENA"
Trade Mark

A. E. ATHERTON & SONS PTY. LTD.

383 LATROBE STREET, MELBOURNE, VICTORIA

MANUFACTURERS OF "ATHENA" KITCHEN, CAFETERIA AND HOSPITAL EQUIPMENT

35c

S.A.A. File No.

[For Other Products, See Index]

KITCHEN AND CAFETERIA EQUIPMENT

Products

Bain Maries, Hot Presses, Teapot Heaters, Coffee Milk and Hot Water Urns, Stock Pots (tilting and stationary types), Jug Pots, Milk Coolers, Butter Coolers, Ice Pans, Coffee Percolators, Pie Heaters, Lay Racks, Dish Washers, Sinks, Hoods.

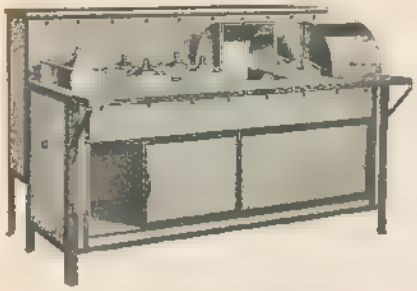
BAIN MARIES. Manufactured of Monel or similar metal, can be obtained in any size, with or without hot press shelf and with ball-bearing sliding doors. The top has a number of vessels for keeping food warm, sitting into a heavily tinned trough of hot water. This water is heated with a steam coil, gas, or electric element.

A corner of the Main Kitchen of the Hotel Alexander, Melbourne.
Leslie M. Perrott, Architect.
A. E. Atherton & Sons, Installers of Equipment.

Service and Facilities

An experience extending over 50 years in installing and maintaining kitchen and cafeteria equipment enables us to design and suggest layouts and methods where maintenance costs can be brought down to a minimum, as to suggest how layouts of various equipments could be improved and space saved by the actual users.

We are desirous of assisting architects and others who are interested in Kitchen, Cafeteria and Hospital Equipment with all the information on the subject which they desire and which it is necessary for them to have for efficient planning during the very early stages of the building project.



Combination Bain Marie (Steam Table), with high-backed Warming Closet.

HOT PRESSES

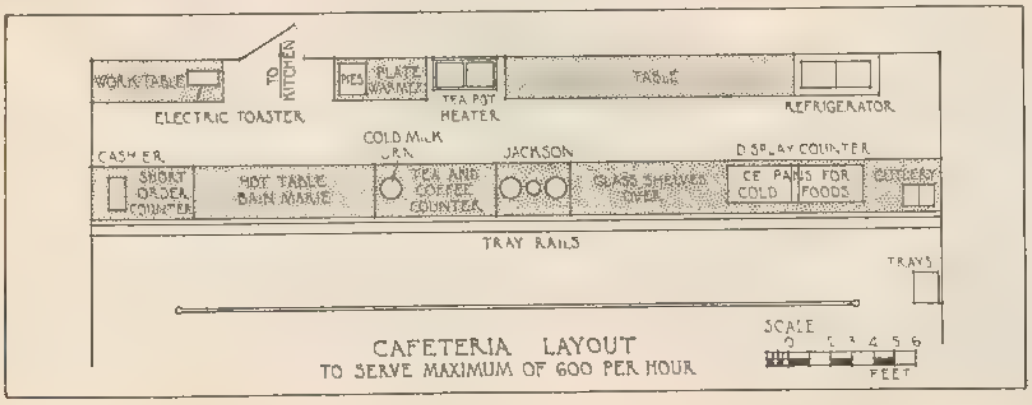
Manufactured of Monel or similar metal, in any desired size, with ball-bearing sliding doors, perforated shelves, steam coils on bottom and under top, thus keeping table warm; gas or electric elements can be used in place of the steam coil.

COFFEE, MILK AND HOT WATER URNS

Usually cylindrical in shape, or in fancy design if so desired. Sizes to suit any number of gallons. Temperature raised by steam coil, gas or electric element. Obtainable in Monel or similar metal, or copper, nickel-plated, with one or more urn cocks.

Are available in single units, pairs, or batteries of three. These urns may be mounted on heavy pipe stands or warming cupboards, as illustrated.

Three-Urn Battery, mounted on Urn Stand and Warmer.



Typical Cafeteria Layout—indicative of the "Atherton" Planning Service.

(Continued on next page)

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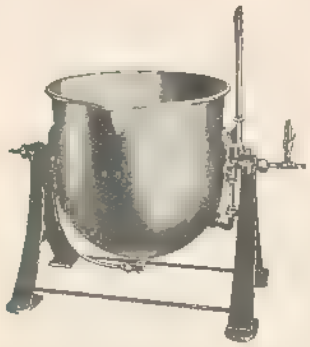

Steam-jacketted Trunnion Kettle. Mounted on a cast-iron trunnion and fitted with lever for tilting.

STOCK POTS (Tilting or Stationary Type)

Stock Pots suitable for steam pressure from 5 to 30 lbs. pressure, or if a higher pressure is required, pots can be specially made to stand any reasonable pressure.

The inner jacket, which is really the food container, is made of copper and very heavily tinned, and the outer jacket is riveted and sweated to inner jacket, and has all the necessary inlets and outlets brazed where required, and if stationary type, a special urn cock that can easily be taken apart and thoroughly cleaned, is let through the outer jacket into chamber.

The tilting type has a curved lip for pouring purposes, the tilting action is by a gear-turning handle, axles mounted on solid trunnions, with G.M. bushings.

JET POTS

The construction of the Jet Pot is similar to a small stock pot with apron extending down, covering jet; jet is fixed in position and the pot is merely placed on it, the ground tapering joint being perfectly steam tight. This means that the pot can be taken away and thoroughly cleaned and sterilised if necessary. Manufactured of copper, nickel-plated and tinned inside, Staybrite, Monel, or similar metal.

Jet Pot.
Note Jet alongside, with tapering joint.

THE "ATHENA" DISHWASHER

Description

The "Athena" Dish Washer is designed to meet the requirements of cafeterias, hotels, hospitals, etc., where the required dish washing service is for 1,000 persons per meal. It is of the rack type and of suitable capacity to wash and rinse dishes, glasses and silverware, also sterilising by steam if so desired. It is fool-proof, and will wash delicate tableware thoroughly and economically under heavy service conditions.

Washing

The principle of inter-locking sprays is employed for the thorough washing of dishes. This operation is performed by forcing 125 gallons of water per minute at high pressure through eight spray tubes four below and four above the dish rack. These powerful jets of hot water strike the tableware at all angles, with the sprays inter-locking to ensure quick and thorough removal of all traces of grease and food.

Rinsing

The rinsing operation is produced with great efficiency and the minimum quantity of water by eight rinse nozzles, through which the water is distributed and spread in a fine drenching spray over the entire area.

Construction

The "Athena" Dish Washer is of simple, rugged and enduring construction, having the following features:—

Pump is of the centrifugal type, with single chamber. Connecting shaft of pump and motor is of selected ground stainless steel, run in ball bearings. Pump manifolds and discharge elbows are of best grade cast iron.

Hood and Tank are of heavy gauge copper, Monel, or similar metal, with framework of 2 x 2 x $\frac{3}{16}$ inch angle iron.

Interior is of copper, Monel, or similar metal, bronze and brass throughout. All parts are removable for cleaning. Four spray tubes and four rinse spray nozzles —all of which are removable—are mounted above the rack, with the same number of each mounted below. All valves have renewable discs. Scrap trays are of heavy brass mesh, and guide rails for racks are of the same materials.

Doors. Two lifting doors, one each side of the machine, are of heavy copper and are operated by a smooth and easy lever action.

THE "ATHENA."
A rack-type Dish Washer.

Simplicity of Operation

No experience is necessary for the operation of the "Athena" Dish Washer. The door lever, rinsing and spraying levers are only those used in the actual washing of tableware.

Installation

The "Athena" Dish Washer is assembled as a complete unit, including pump, and is delivered ready for electric, water, steam and waste line connection. Installing the "Athena" is as simple as connecting an ordinary plumbing fixture.

Data on Athena Dishwashers

Floor Space—	
Length, inches	28½
Width, inches	28½
Height, inches	64
No. Racks Furnished	
Plate Racks	2
Cup Tray	1
Silver Tray	1
Motor, H.P.	1
Steam and Water Connections, inches	½
Waste, inches	2
Shipping Weight, net lbs.	650

(Continued on next page)

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"ATHENA" HOSPITAL EQUIPMENT

Complete Hospital Equipment

An exacting study of the necessary mechanical equipment for the modern hospital has led to the development of the "Athena" line of equipment, which, during the process of manufacture, has had the advantages of skilful and scientific engineering and careful supervision, resulting in the production of sterilizers, etc., of which every part is designed fully to meet its own individual service requirements. The "Athena" line covers a full range of autoclaves, hydro operated utensil sterilizers, oil cushioned instrument sterilizers, bed pan washers and sterilizers, valves, bottle washers, tip-up basins and all mechanical hospital equipment; also hot and cold sterile water plants, both electric and steam automatically operated for temperature.

Service

A service department is maintained for the purpose of offering suggestions and co-operation to the architect for the successful planning and installation of all types of mechanical hospital equipment. We will be pleased to prepare sketches of sterilizer room layouts of an appropriate size and character to suit the individual job of the architect.

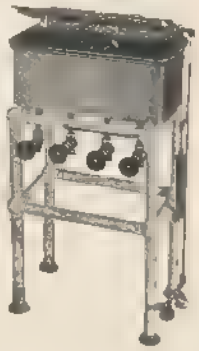
Sterilizers

Only selected copper sheets are used in the manufacture of autoclaves and other sterilizers, and where castings are used the best close-grain bronze castings are employed. All castings and copper sheets are finished in nickel plating.

This equipment can also be obtained in either monel metal or other similar metals.

(At left): Utensil Sterilizer

(At right): Instrument Sterilizer.



Hydro Type Utensil Sterilizer

This sterilizer is entirely automatic, being foot operated by means of a patent valve. When pedal is in the "Raise" position, water passes through the valve into the hydro cylinder, raising the cover which automatically lifts up the tray containing the utensils to be sterilized. When valve pedal is in "lower" position, water is forced back through the waste outlet of the valve, letting cover and tray down gently. Water is automatically cut off by means of the valve on the water supply when cover is opened. This makes the sterilizer positively self operating. The water is boiled by means of steam coil, electricity or gas.

Oil Cushion Instrument Sterilizer

Is absolutely protected against water pollution by the sterilizer. Made of bronze, brass and copper, N.P., and mounted on a white enamelled pipe stand, and provided with a mechanical pedal lift for operating cover. An oil check prevents seaming of cover. It has a large drain covered with a removable screen, and is fitted with one full-length and two half-length trays. Steam coil and all necessary special heavy duty valves for hand control of water supply, waste and steam are installed complete.

Finish.—Exterior highly polished nickel; interior heavily tinned. Stand is white enamelled, or other colour if desired.

Overall Dimensions.—3ft. 2in. high, 20in. long, and 14in. wide.

Auto Clave Sterilizer

This is a steam-jacketted sterilizer made from bronze, brass and copper, mounted on tubular steel pipe stand. Vacuum and automatic air and condensation elimination ensures perfect steam penetration and quick drying.

The operation of the sterilizer is controlled by three valves only. All necessary gauges, safety valves, complete with steam coil heating equipment, with special heavy duty type valves for hand control, are installed. One instrument tray is provided.

Provision is made for atmospheric steam, air and condensation exhaust into piping system in accordance with most exacting codes.

Finish.—Exterior of exposed sterilizer is highly polished nickel; interior is heavily tinned. Exposed stands are white enamelled or finished in other colours if desired.

Exposed parts of built-in sterilizer are highly polished nickel. Sides of the concealed body are covered with air-cell asbestos held in place by treated canvas. Built-in stands are varnished aluminium.

Bed Pan Sterilizer (Exposed Type)

The pan is thoroughly washed and sterilized in the one operation; the pan comes out dry and ready for racking or further use. The sterilizer is cylindrical in shape, being 18 in. in diameter and approximately 3 ft. high, and is connected to the sewer system with a 3 in. soil trap water connection. The pan is washed by a flushometer, the water being sprayed, through a perforated rose washing pan, inside and out. A flooding ring is also set around top of sterilizer for the purpose of cleaning sterilizer while the pan is being washed. Spray for this connection is taken from the flusher.

(At right). Bed Pan Sterilizer, Closed

(At left). B P Sterilizer, Open.

Bed Pan Sterilizer (Concealed Type)

The "Athena" Concealed type Bed Pan Washer and Sterilizer is mounted on an S soil trap, the trap being concealed in the wall; the door of the Sterilizer locks steamtight. The operation, by means of a foot pedal, allows the door to swing open into a horizontal position without noise.

The illustration (at right) shows an "Athena" Bed Pan Sterilizer in position—complete with flush valve and steam control; the installation is at the St. Vincent's Hospital, Melbourne.

(Continued on next page)

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Milk Bottle Sterilizers

Made of bronze, brass and copper, mounted on white enamelled pipe stand. Mechanically foot-operated lift for cover only, with oil check to prevent slamming of cover.

One complete set of bottle racks; complete heating equipment, and all necessary special duty type valves for hand control of water drain and steam supply.

Larger sizes have cabinets underneath for bottle storage Water filling pipe is above level of overflow, thus meeting the most exacting codes.

Finish.—Exterior highly polished nickel; interior heavily tinned. The bases of the two larger sizes and all pedal mechanism are finished with hard black enamel; stands of three smaller sizes are white enamelled, or of other colour if desired

Installation of Sterilizers

Our service department will give all information regarding the sizes and nature, lines and fixtures of plumbing and steam lines, etc., necessary to suit the capacities of the various sterilizers that are installed. Furthermore, we will prepare detailed layout that will show the complete installation of all lines, connections and fittings, etc., required for the perfect functioning of sterilizers.

Bed Pans

Bed pans manufactured from monel metal are available. The use of this material ensures their resistance to the heavy service met in daily hospital use. They are not affected by sterilizing solutions, and are entirely corrosion resisting

Blanket and Bed Pan Warmers and Solution Cabinets

Cabinets are made from rust-proof terne plate and are lined with asbestos cement board for heat insulation. Doors are hung on ball-bearing hinges and are equipped with eccentric or bar-locks to ensure tight closing of door, which renders the cabinet dust-proof. Complete heating equipment is located so as to provide for uniform distribution of heat. If electrically heated, blanket and bed pan warmers will be controlled by a toggle switch without thermostatic regulation of temperature.

Solution warmers and solution compartments of warmers are controlled by an accurate thermostatic device which automatically regulates the temperature.

Food Waggons

Food waggons manufactured from monel or similar metals and silver frosted sheet steel are available. They are thoroughly insulated and fitted with electric heating elements. Waggons are provided with drop doors which can be used as a table for dishes, etc., when emptying or refilling

All waggons are mounted on specially constructed hospital type swivel spring socket ball-bearing tyred wheels, which make them very light to handle.

Trays

We have a wide selection of tray racks, dish racks, utensil racks and linen trucks, all of which are constructed with monel metal, and mounted on special hospital rubber-tyred wheels.

Sinks

Sinks of Monel, Silveroid or similar metal are available. These have a glass-smooth surface that resists the attacks of food and fruit acids—a surface that can be kept bright and clean with ordinary care. They are rust-proof and chip proof, with a steel-like strength and toughness.

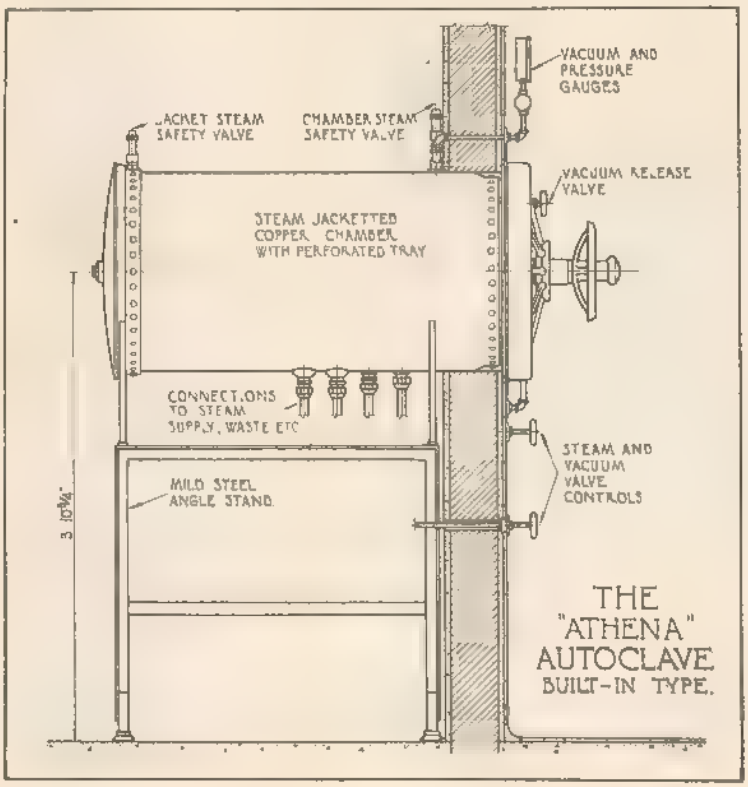
Some features of metal sinks:—

(1) Rust-proof, highly resistant to corrosion and strong as steel.

(2) Solid metal clear through, with no coating to chip, crack or wear off.

(3) Obtainable in any size or shape.

(4) Less weight, saves labour expenses in installing



Built-in Autoclave Sterilizer as supplied to the Children's Hospital (Orthopaedic Section), Frankston, Victoria.

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"GARNAY"

GARDNER & NAYLOR PTY. LTD.

Head Office and Works:

304-308 SPENCER STREET, MELBOURNE, C.1.

TELEPHONES: F 3679, F 3670

35c

S.A.A. File No

[For Other Products, See Index]

KITCHEN EQUIPMENT

Importance of Kitchen and Cafeteria Design

General.—The important factor in designing a Kitchen, Cafe or Cafeteria layout is not so much to find space for a fitting, as to place it in such a position as will suit the proper sequence of operations

Messrs. Gardner & Naylor from their very wide experience of this type of work, are able to develop each cycle of operation, so that all movement is natural, unobstructed and progressive, leading right from the entrance of the raw material to the point at which the finished article is taken from the servery.

Experience in Manufacture

Over 25 years' experience in the design, manufacture and installation of Kitchen Equipment.

The following list comprises some of the leading users of GARNAY Equipment: in most cases the complete installations were carried out by this firm:—

Victoria:
G. J. Coles Ltd., Griffiths Bros. Ltd., Myer Emporium, Victorian Railways, "The Victoria," Athenaeum Club, "Argus" Office, New A.M.P Building, Buckley & Nunn Ltd., Scotch College Lucullus Ltd.

N.S.W.:
Farmer & Co. Ltd., Woolworth's, G. J Coles Ltd., Griffiths Bros. Ltd.

Queensland:
G J. Coles Ltd., Griffiths Bros. Ltd

South Australia:
Myer Emporium, G. J Coles Ltd., Griffiths Bros Ltd

Tasmania:
Goodwill Stores, Hobart

In addition, "Garnay" Kitchen Equipment is used in hundreds of smaller installations in Hotels, Restaurants, Clubs, Hospitals, Stores, etc., throughout Australia

Twelve Foot Hot Press with Bain Marie Vessels, Quadrant Covers over Carving Wells, and Monel Meta Top.

Typical Double Service Kitchen Installation at the "Argus" Office Melbourne.

Hot Presses

These are for keeping prepared food and plates from the kitchen hot until served. The top is polished monel metal, into which carving wells of monel metal are fitted with quadrant cover. The interior has two shelves, independently heated. Sliding ball-bearing doors are fitted at one or both sides of the press.

The panels and doors are hygienically and attractively finished in white enamel with nickel plated cover strips and trimmings, the whole unit being fitted on legs

Standard sizes are. 6 ft. x 3 ft., 9 ft. x 3 ft., 12 ft. x 3 ft. Any size may be made to suit the layout of the kitchen.

Bain Maries

A Bain Marie is often fitted in the monel metal top of the hot press and consists of a tank, containing boiling water, heated either by gas or steam, into which vessels containing soup, vegetables, and the like are placed through holes and held by a flange, the boiling water keeping the foods hot until they are required for service

Usually constructed of monel metal, Bain Maries are sometimes used as a separate fitting, when they can be placed on a bench or stand.

These fittings can be operated by steam, gas or electricity.

Steam Oven Cookers

This fitting can be supplied in two and three oven sizes

The general construction is heavy cast iron, with wrought steel casings; the steam-tight doors are swung on heavy hinges, and are provided with special door tightening gear and rubber insertion seat. This fitting is used for steaming potatoes, puddings, fish, etc., galvanized wire vegetable baskets being supplied

(Continued on next page)

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Steam Oven Cookers - contd.

Three Oven Steam Cooker.

Steam pressures up to 15 lbs. are suitable, each compartment being under separate steam control, so that each can be used for separate purposes. The contents are cooked or steamed by free steam, which fills the compartment. This fitting can also be supplied for gas operation. Overall sizes 2 ft. 4 in wide, 2 ft. deep, the height is dependent on the number of ovens.

Ovens and Boiling Tops

Ovens and Boiling Tops supplied for gas or electric operation.

Baking Ovens

For baking and pastry; gas or electric. These fittings are designed so that the heat is evenly distributed over the whole oven, which is efficiently insulated. Units can be supplied, consisting of one, two or three ovens, according to the requirements of the kitchen. Automatic control of the oven temperatures is of great assistance in the operation of baking ovens.

For quantity production, coke or oil-fired steam ovens are most efficient

Ranges

Ranges are available for solid or oil fuel

Wall types can be supplied in single units up to 8 ft. long, with three ovens. Table ranges vary in size from two to six ovens, and can be arranged, if necessary, with flue carried under the floor instead of overhead to the main stack. Ranges usually require special flues built into the construction.

Six Vessel Jet Pot Table

Jet Pot Tables

Are used for preparing soups, sauces, custards, boiled puddings, etc.

A series of steam jacketed vessels are fitted on a cast iron table on specially designed steam jet fittings, from which they are removable.

A valve panel from which each pot may be controlled is fitted at the end of the table.

Exhausts are collected from each jet pot into one main pipe, which runs to waste and is fitted with steam trap.

Each fitting consists of a monel metal interior, steam jacket and N.P. copper exterior and N.P. lid

"Invincible" Pie Warmer

"Invincible" Pie Warmers, for gas, electric or steam operation, constructed with cast polished aluminium frame and trays and casing of heavy-gauge, hard rolled copper, nickel plate finish. An efficient insulation surrounds the warmer, which greatly increases its heating efficiency

All trays are interchangeable and are fitted with neat N.P. face and knob handle

Electric Pie Warmer heating elements are provided with three-heat control.

Steam Jacketted Tilting Pans.

Steam Jacketted Pans

Tilting or fixed types Designed to operate at steam pressures up to 15 lbs. per sq. in or by gas. The standard fitting has a monel metal interior with the exterior nickel plated. Also supplied in plain copper fitted with tinned interior A balanced lid of N.P. finish may be supplied if required

If the fitting be of the tilting type, it is fitted on two trunnions, through which the steam and exhaust connections are taken The pan is tilted by means of a hand lever for the smaller size. Larger sizes are tilted by means of wheel-operated tilting gear. These pans can be supplied with cantilever brackets or stand

OTHER EQUIPMENT

Grillers

With top or side heat, used for grilling steaks, chops, etc., and may also be used for bread toasting

Toasters,
Fish Kettles,
Hot Cabinets,
Monel Metal Sinks and Draining Boards

Constructed of heavy gauge monel metal and supplied in various sizes A feature of these sinks are the neatly rounded covers.

Can also be supplied in a light type of monel metal

Teapot Rinse

This fitting, which is circular, is fitted flush with sink top. The main cylindrical container is constructed of monel metal with an internal perforated strainer for collecting the refuse leaves. This is removable for cleaning. A press-down valve, fitted with an ebonite knob on to which the inverted teapot is pressed, operates the flushing sprays, which wash the pot both inside and out

The standard teapot rinse, which is 9 in. diameter, requires waste and water connections.

Vegetable Paring Machines,
Electric Mixing Machines,
Bread Cutting Machines,
Urns

Urns are manufactured in standard sizes from one to ten gallons for either gas, electric or steam operation.

Standard fittings are constructed of heavy gauge copper with tinned interior and nickel-plated exterior, nickel-plated domed lid and draw-off cock. Milk and coffee urns are water-jacketted and have special interiors of cupro-nickel alloy or earthenware, the draw-off taps being of special design to facilitate cleaning

When urns are to be used especially for coffee, rings are supplied for coffee bags

Electric urns are provided with three heat control and automatic safety cut-out.

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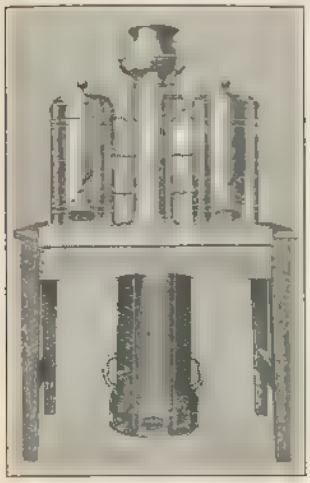
"Invincible" Cafe Fountain (Gas Operation)



"Invincible" Cafe Fountain with Water Jacketted Urns.

This fitting, which has been used extensively throughout Australia, is designed to supply fresh boiling water only for tea making in cafes, cafeterias, large kitchens, etc It consists, essentially in the lower section, of an efficient gas boiler —the upper N.P. column houses an expansion arrangement so designed that only boiling water can be drawn.

The construction is heavy gauge, hard rolled copper, interior tinned. All parts appearing above the counter are N.P., including a copper cold-supply tank housing the ball valve, which makes water supply automatic

An outstanding feature of the "Invincible" is the large and efficient heating surface in the boiler, making it well suited for heavy and continuous service

The "Invincible" Cafe Fountain is made in two sizes.

A smaller edition of this fitting for gas operation is the "Invincible" Counter Boiler, which is suitable for fixing on the top of a counter

A monel metal top and drip tray is supplied with the Fountain

"Caloric" Cafe Fountain

This is a steam-operated fitting, other features being the same as the "Invincible" Fountain. The "Caloric" will deliver a constant stream of boiling water

"Caloric Junior" steam-heated Cafe Fountain is a smaller model of the "Caloric."

Water-jacketted urns for milk and coffee may be connected to the fountain, as illustrated

Send for Descriptive Pamphlet

"Invincible" Dish Washer

This machine was the first of its kind manufactured in Australia and has been used extensively throughout the Commonwealth

A few of the larger users are:—

The Myer Emporium Ltd.	6 machines
G. J Coles Ltd.	8 "
Woolworth's	3 "
Griffiths Bros. Ltd.	7 "
Commonwealth Bank	3 "
"The Victoria"	3
Victorian New South Wales, and South Australian Railways	5

The "Invincible" Dish Water washes, sterilises and dries crockery, glassware and cutlery at the astonishing rate of 3,000 pieces per hour.

Fitted in a strong metal cabinet 2 ft. 4 in. wide, 2 ft. 3 in. deep and 5 ft. high, the "Invincible" Dish Washer is extremely compact. A reservoir of water constructed of hard rolled tinned copper or monel metal is kept at boiling point by either electricity, gas, steam, or auxiliary heat Six wooden trays are supplied with the machine

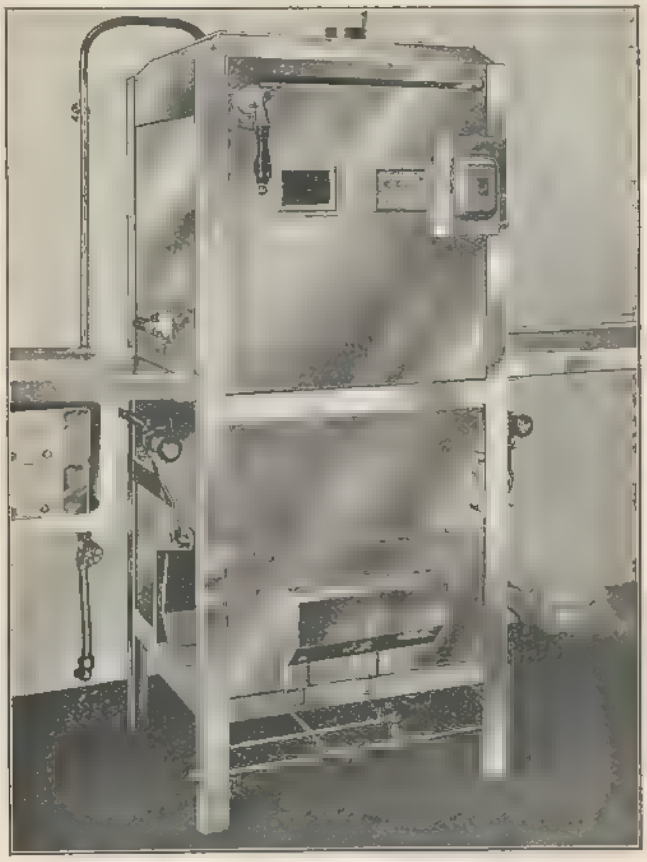
A patent Rinsing Spray Valve reduces the quantity of hot water for the final spray to a minimum and a gunmetal pump delivers the water at a high pressure

Constructed in heavy gauge, hard rolled copper with angle framing and galvanized iron work, the standard "Invincible" Dish Washer will withstand many years of faithful and efficient service The special model is constructed in monel metal

LAYOUT.

The position and arrangement of the benches associated with the Dish Water have a direct bearing on the efficient operation of the machine. Kauri benches, provided that they are correctly designed and strengthened, are cheaper in initial cost and give reasonable service.

Monel metal is, however, the ideal material, and, unlike steel and iron, does not rust but wears white. Because of our practical and scientific knowledge in regard to this phase, we suggest that you enlist our assistance in determining a specific layout for your "Invincible" Dish Washer.



The "Invincible" Dish Washer

(Continued on next page)

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CAFETERIA EQUIPMENT

Standardised Cafeteria Units

These units have contributed in no small degree to the success of our installations. The whole of the counter construction, including frame work, top, marble, or other front and interior shelving, is cut and drilled to templates. The counters are made in standard section lengths, permitting quick extension without interfering unduly with the business of the cafeteria.

Standardised equipment assures rapid construction, erection without difficulty, easy replacement, alteration or extension, and, finally, Capital Cost is lowered.

Counters

The framework is sturdily constructed of metal throughout. The advantages of the steel frame construction are — strength, speed of erection, the space not long out of revenue-producing condition during change over — easily removed and refixed — space saved, as more shelving possible with steel construction — permanent, no decay—easily cleaned

Cafeterias

The majority of the largest cafeterias in Australia have been installed by Gardner & Naylor. Notable installations include G. J. Coles Ltd. Melbourne, Sydney, Brisbane and Adelaide, Farmer & Co. Ltd., Sydney; Woolworth's, Perth; Goodwill Stores, Hobart. Every cafeteria installed by us is returning handsome profits.

Design of Cafeterias

Every cafeteria installation has its own peculiarities, due to differences both of type of service adopted, and local conditions, and requires careful and independent consideration, in order that the maximum efficiency is to be obtained from the plant. By means of careful planning, it is possible to utilise the available space to the greatest possible extent, and to reduce operating costs to a minimum. The following points require consideration, in order to obtain speedy service and maximum efficiency and return.

Main thoroughfare from entrance (or elevator) to service counter, exit from counter to cafeteria space, relation of preparation room and kitchen to main service counter, position, size and design of dish washing room, and probably the most important of all, the design of the main service counter and back benches.

Gardner & Naylor's equipment is designed in the light of many years of experience gained in the supply and installation of cafeteria equipment of all descriptions throughout Australia.

The top and front of counters have a non absorbent surface, and are manufactured in standard sections of length found most suitable for all conditions. This is a decided advantage in that they can be taken down and re-erected in a very short time, and at little expense. Counters also may be shortened or lengthened by removing or adding sections, with little difficulty. The exterior finish would be in keeping with the dominant decorative motif. The panels can be of steel, porcelain enamelled in various colours, marble of various shades and types, or tiles.

Back Benches

Back Benches provide extra working and shelf space behind the main service counter, usually constructed of Monel metal or other cupro-nickel alloy, and fitted on N.P. flanged standard legs. If sinks and other extra equipment are required, they are usually fitted in back bench.

Food Display Cases

Standard Gardner & Naylor display cases are of rigid construction, consisting of plate glass shelves and protective fronts, supported by N.P. columns which are firmly stayed by N.P. rods and mountings. The cases, which are made in standard sizes to suit the service counters, are three or four tiers high, and one to four sections long, according to the type of counter.

The design of these fittings conforms to the best hygienic standards.

Subveyors and Conveyors

When the dishwasher floor is some distance from the kitchen, conveyors can be used for food and soiled dishes.

In one of our installations an entire floor is used for service whilst a system of subveyors and conveyors is used to communicate with another floor where stores and crockery, etc., and the dishwasher are located.

Service Equipment

The secret of successful cafeteria operation lies in quick service, and the equipment must stand up to the work.

Much of the kitchen equipment described and illustrated in the preceding pages is admirably suitable for cafeteria work. This includes Dishwasher, Cafe Fountains, Urns, Pie Warmers, etc.

In addition, special equipment for cafeteria service is manufactured by us, including:—

(Continued on next page)

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WARMERS

The following fittings can be supplied:—
PIE WARMERS, of capacity suitable for the service required
SAVELOY WARMERS, including plate warming cabinet.
SOUP BAIN MARIES with inserts of number and capacity for the menu decided on, together with bowl warmers.
The above fittings may be operated by either steam, gas or electricity

TOASTERS.

Toasters of the automatic type are recommended.

HOT SERVICE COUNTERS.

If it is desired to serve special entrees, fish, etc. with vegetables, a special Bain Marie fitting is provided in the main counter, with inserts of sufficient number and size to serve the variety of menu desired, including inserts for sauces and gravies. Other portions of the counter are varied to suit the hot service.
The whole of the Bain Marie vessels are constructed of special cupro-nickel alloy, to withstand vegetable acids etc., rounded corners and neat finish being features of these fittings.

CAFE FOUNTAIN.

This is a unit of great importance in the successful operation of a cafeteria. Owing to the speed of service to be maintained this fitting must provide practically a constant supply of boiling water Either our "Invincible" (for gas operation) or "Caloric" (steam operation) which have proved themselves in cafeteria work of the heaviest description, are most suitable for this work. Water-jacketted Urns connected to the Fountain provide milk and coffee and cocoa. If necessary and have special interiors to stand the heavy service

SALAD PANS.

These are provided in the service counters for cooling salads, etc., for direct service, and may be either ice or refrigerator cooled.

MILK COOLING CABINETS

These are supplied complete with milk pump and are provided with polished metal top, heavily insulated cabinet, and may be cooled either by ice or mechanical refrigeration.

SODA FOUNTAINS.

These are provided, where necessary, of size and type to suit the type of service; supplied complete with carbonator, refrigerating unit, syrup containers with syrup pumps, soda arms, and special polished metal top.

ICE CREAM CABINETS.

Supplied in variable sizes, complete with polished metal top, specially insulated walls and lids, and air-cooled type compressor unit built in as an integral part of the cabinet.

REFRIGERATING CABINETS.

Service cabinets are usually fitted in main service counter for cooling foods such as jellies, custards, cream, etc., for direct service over the counter Storage refrigerating cabinets are fitted either in the preparation room or kitchen, dependent on the layout and size of establishment, and are of sturdy construction, with walls, floors and doors heavily insulated Air-cooled type compressor units are used for cooling the cabinets.

"GARNAY" COMBINATION ICE CREAM CABINETS.

"Garnay" Combination Ice Cream Cabinets are manufactured at our works and combine attractive appearance and lasting service.
The top and trimmings are of highly polished monel metal, and the side panels finished in porcelain enamel or duco.
Other features include welded steel frame, bitumen floated sealed cork board insulation, heavy gauge tinned copper interior, bottle and milk storage compartments, adjustable temperature controls and specially treated milk container

QUICK LUNCH COUNTERS.

The outstanding advantages are: –
1. The speed at which the customer may be serve
2 Smallness of the staff required,
3. Compactness of the space required
4. Attracts business all day long
5. Low cost at which food may be served (lower even than the cafeteria)

Every part of the equipment is designed for speedy service As soon as a chair becomes vacant, whilst another occupant is being seated, the dishes are being cleared away counter cleaned, and the order being taken. As every part of the equipment is so conveniently placed, the customer can be served without delay The staff required is surprisingly small considering the volume of business handled It is estimated that the average time taken by each customer is only nine minutes.

The limited space into which a quick lunch counter can be fitted is shown in the illustration. The distance between each seat is ample for comfort comfortable seats and foot-rail ensure a restful position for customers.

SEATS.

These are designed to withstand heavy and continuous service, and can be supplied both with and without backrests, revolving or fixed The base and column are of heavy cast iron, white enamel finish and of neat design Footrests and mountings are heavily nickel plated

STAFF KITCHENS

Many staff kitchen installations have been carried out by Gardner & Naylor The essentials are rapid service and the employment of a minimum of permanent staff

The staff kitchen at the "Argus" office and installations at the British Australian Tobacco Co., and the new A M P Building, Melbourne, are representative of installations carried out by us.

HOSPITAL EQUIPMENT

It is essential that the design and manufacture of, and materials used in hospitals, and especially sterilizing equipment where correct operation is so vital, be such as to result in products of the highest standard. Strong construction and careful workmanship mean uninterrupted service, which is essential in hospital routine.

Gardner & Naylor sterilizing equipment, manufactured at the works in Spencer St., Melbourne, has been proved by constant use in hospitals, both large and small, throughout Victoria, for a number of years—such equipment has been installed in hospitals such as —The Alfred, Austin, Children's, Mont Park, St George's Intermediate, Queen Victoria, Caulfield Military Base, Fairfield Infectious. District hospitals at Bendigo, Horsham, Swan Hill, Mildura, Ballarat, Hamilton, Warragul, Warrnambool, Geelong, Mooroopna, Wangaratta.

In most of the hospitals in the foregoing list, the steam, hot water, kitchen and sterilising equipment was installed by Gardner & Naylor. In many cases the complete laundry equipment was also carried out by this firm.

"GARNAY" HIGH-PRESSURE DRESSING STERILIZERS (AUTOCLAVES).

High-pressure horizontal sterilizers for steam, gas, or electricity
It has been established that steam at a pressure of 15 lbs. per square inch, or more, not mixed with air, thoroughly permeating an article for five to ten minutes, will render such an article sterile.

The Gardner & Naylor standard, high-pressure, Dressing Sterilizer is designed to operate under these conditions, and consists of an inner sterilising chamber constructed of heavy-gauge planished copper, with tinned interior, surrounded by a steam jacket of similar construction.
The massive door and frame are constructed of cast bronze, with a special seating and machined face to stand the necessary pressure. The door-tightening mechanism, consisting of screw gear and locking bars, are of steel and bronze. The ball-bearing door hinge is adjustable for wear, and eliminates door sagging

Vacuum or air eliminators ensure that the air is removed from the chamber for complete sterilisation.

(Continued on next page)

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HOSPITAL EQUIPMENT (CONT.)

PANEL TYPE DRESSING STERILIZERS

Panel Type Dressing Sterilizers, where possible, to be used, are an improvement on the exposed type, in that the whole of the sterilizer body is built in behind a wall, the face of which is usually tiled or panelled in monel metal, only the frame of the sterilizer door being exposed, the valves, pressure gauges, etc., being arranged neatly in a panel on the face of the wall (see illustration).

EXPOSED TYPE DRESSING STERILIZERS.

If exposed type, this fitting is supplied with white enamelled pipe stand

The sterilizer body and mountings are all heavily nickel-plated and tilting and placing of controls is natural and convenient to operate

GARNAY Dressing Sterilizers can also be supplied in monel metal.

High-Pressure Dressing Sterilizer and Boil-up type Utensil Sterilizer—Steam Operation.

"GARNAY" LOW PRESSURE VERTICAL STERILIZERS

GARNAY Low-Pressure Vertical Sterilizers, which have been in use for many years in smaller private hospitals, are less expensive than the autoclave type, both in first cost and cost of operation.

"GARNAY" UTENSIL AND INSTRUMENT STERILIZERS.

"Garnay" Utensil and Instrument Sterilizers for steam, gas or electricity. "Garnay" sterilizers are designed to sterilize by boiling, which is the general practice. They can also be arranged to operate by free steam.

The construction of the sterilizer is heavy-gauge, hard-rolled copper, the interior being thoroughly tinned and the exterior nickel plated finish. The N.P. domed lid is of the "water seal" pattern and is operated by a balanced treadle action which, for the larger utensil sterilizers, has a dash pot cushioning arrangement. The treadle operation can also be arranged to raise the perforated lifting tray which is supplied with [illegible]. Hydraulic [illegible] can be [illegible] for treadle action if required, or less expensive hand-operated balanced lids can be supplied.

These sterilizers also may be supplied with white enamelled N.P. pipe standards, or cantilevers.

"GARNAY" WATER STERILIZING EQUIPMENT.

Gardner & Naylor water sterilizing equipment, which is designed to remove bacteria from the water supply, consists of the following. Two polished copper containers for storing hot and cold sterile water. The interiors are thoroughly tinned and gauge glasses are provided for indicating the water level. A high-pressure water filter clears the water supply before entering the system.

Heating can be by steam, gas or electric operation, or a combination for special requirements. In smaller systems with storage of 16 or 20 gallons of hot and cold sterile water, the complete equipment can be fitted in a panel on the wall, with all pipes and mountings N.P. finish. This takes up a space six feet wide.

DISTILLED STERILE WATER EQUIPMENT.

Distilled Sterile Water Equipment is sometimes preferred to the plain sterile water system, especially in cases where the water is to be used for chemical solutions.

"Garnay" equipment is designed to suit the special requirements of the layout.

Three Panel Type, High-Pressure Dressing and Utensil Sterilizers, showing Indicator Gauges and Control Valve Panels.

WARD PANTRY FITTINGS

Ward Pantry Hot Press for keeping food from the stove warm until delivered to ward patients.

This fitting is finished in white enamel with N.P. mountings and is provided with two shelves and sliding doors and a removable jet pot vessel, with monel metal interior and a water boiler, both fitted on the monel metal top.

Dimensions—3 ft. 6 in. x 1 ft. 9 in.

LAUNDRY FITTINGS.

Washing Machines, Gas and Steam-Heated Ironers, Hydro Extractors, Soap Boilers, Drying Rooms, are provided of sizes to suit the requirements of the Hospital.

Gardner & Naylor have carried out many hospital and other laundry installations throughout Victoria.

"GARNAY" BED PAN STERILIZERS.

A sanitary, convenient and durable apparatus for the efficient cleaning of bed pans.

It empties, washes and sterilizes; complete emptying is ensured by the tilting of the rack beyond the perpendicular, the water flushing spray is operated by a flushometer valve and sterilization is effected by steam.

A simple pedal operation opens or closes the apparatus.

The Sterilizer is supplied complete with a trapped soil waste pipe and a vent connection to suit M.M.B.W. requirements.

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G A S Incineration

THE AUSTRALIAN GAS LIGHT CO.

PITT, BARLOW AND PARKER STREETS, NEWMARKET, SYDNEY.

Phones M 6503 (24 lines)

GAS — GAS APPLIANCES · REFINED TARS — DURATAR ASPHALT — PITCH — CARBOLIC OILS — FUEL OILS BENGALI — MOTOR SPIRIT — SOLVENT NAPHTHA — SULPHATE OF AMMONIA

35j

S.A.A. File No.

For Other Products, See Index]

INCINERATION BY GAS

(Section 6, continued from page 349)

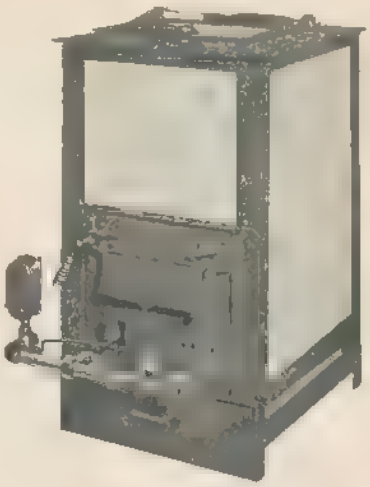
Health requirements, coupled with the growing needs of modern building schemes, render it desirable, if not necessary, that refuse from dwellings—and more especially kitchen refuse—be disposed of frequently by hygienic means. In other parts of the world domestic incineration has become firmly established and it is making rapid yearly progress. Here in Australia it is not as yet very widely used, but the idea is rapidly gaining favour.

Incineration by Gas is Highly Efficient

Incineration by gas is now recognised as one of the finest methods available. It is extremely simple, perfectly clean, eliminates all odours from burning refuse and disposes of a wide variety of undesirable matter in a thoroughly hygienic manner. The gas incinerator provides a small, compact, out-of-the-way container for all waste accumulations, destroying them at convenience of the user before they have time to decompose and thus create foul odours and germ-breeding grounds.

Many Types Different Sizes

Having proved its efficiency for domestic incineration, gas was quickly applied to more difficult types of waste disposal with a corresponding degree of success. The result has been that gas incinerators are now made in types and sizes to suit almost every class of building. These include small portable types for hospitals, clinics, apartment buildings, etc. All of these are not yet available in Australia, but with the further development of hygienic garbage disposal the importation, or manufacture locally, of suitable equipment is almost assured. The gas-heated types already available serve many needs and are indicative of the vast potentialities of this highly efficient system.



A Modern Gas Incinerator.

What Gas Incineration Means

The gas incinerator does away with the storage of garbage, refuse, etc., and renders the use of a garbage tin or similar receptacle unnecessary. It destroys wet or dry vegetable garbage and refuse, waste paper, dirt sweepings, and collections of all descriptions quickly and silently without creating any odour.

Easy to Install

A gas incinerator can be readily installed in the kitchen or laundry as it takes up very little space and the gas connection involves very little work. This has particular application to the portable type, but in the case of the wall type the installation work is also simple and straightforward when suitable provision has been made to accommodate the incinerator

Ideal for Hospitals and Public Institutions

Modern gas incinerators provide an excellent system for the removal and disposal of waste from operating theatres, wards and kitchens The intense heat destroys every particle of medical and surgical waste and germ-laden refuse, reducing it to a fine ash and at the same time sterilising itself.

As the immediate disposal of medical and surgical waste is one of the greatest factors in preventing disease and in conserving health, the gas incinerator is worthy of a place in almost every hospital.

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S A A File No.

GOODRID INCINERATOR CO.

50 MOUNTAIN STREET, SYDNEY

Phone M 6181

Patent Nos. 18480, 15033, 28365, 21084

GOODRID

Products

Chute or Chimney-fed Incinerators, for the destruction of garbage and waste materials from Flats Hotels Hospitals, Schools, Public Institutions and Private Residences.

Direct-fed Incinerators, for Factories, Warehouses, Stores, Public Buildings, Hospitals, Hotels, Theatres, and Private Homes.

Wood-shaving Incinerators.

Municipal Garbage Destructors.

General Description

The Goodrid Incinerator consists of a brick combustion chamber with firebrick lining. It can be located either inside or outside any building. The chimney-fed type is located at the base of the chimney. Refuse is fed into it through a hopper receiving door opening into the flue from the kitchen, hall, or other convenient points on the floors above (any number of hopper doors may be used to feed the Incinerator)

Patent Down Draught Cone.—All Goodrid Incinerators employ the Goodrid Down Draught Cone, or Cones, for air admission because of the following distinct advantages

1. Greatly increased burning capacity per unit of Incinerator volume, thus reducing the first cost of the installation

2 High efficiency and temperature because the cone when fire is lighted in combustion chamber directs a current of air at great force directly into and over top of garbage and waste material. This ensures rapid and complete combustion by top burning—admitted to be the latest and most scientific method of garbage destruction

3. Impossibility of smothering the fire because the fire is forced always from the top downwards.

4. The cone system of top draught air admission eliminates all odours and largely reduces smoke troubles.

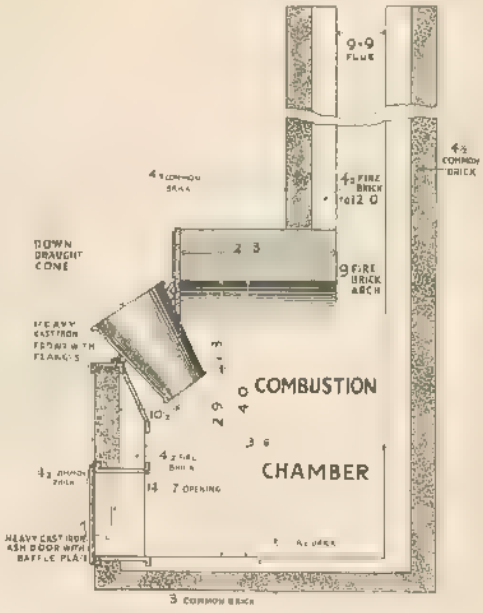
Goodrid Commercial Type Incinerators

Goodrid Incinerators eliminate fire risks, are approved by the Fire Underwriters, reduce costs of waste and garbage disposal keep the premises free from rats etc, and conserve space by avoiding garbage storage.

Goodrid Commercial Incinerators are built in standard sizes with standard commercial common and firebricks. This feature of design and construction reduces maintenance to a minimum

Provision for expansion and contraction is made in each of the parts.

The firebrick top arch in the larger models is held securely in position by heavy angle irons let flush into side walls of combustion chamber at foot of arch, and side walls are buck stayed with channels and tie rods. Standard sizes are given in Table 1.



MODEL 15/9

TABLE 1

STANDARD SIZES FOR "GOODRID" TYPE COMMERCIAL INCINERATORS

Model	Capacity cu. ft. per hr	Overall Sizes			Fire Chamber		Inside Dimensions
		Length	Width over Buckstays	Height	Width	Length	Flue
14/9	35	4ft. 7½in.	3ft. 9in.*	5ft. 3in.	2ft. 3in.	3ft. 1½in.	9in. x 9in.
15/9	56	5ft. 0in.	4ft. 10in.	5ft. 3in.	3ft. 0in.	3ft. 6in.	9in. x 9in.
16/9	78	5ft. 8in.	4ft. 10in.	5ft. 3in.	3ft. 0in.	4ft. 2in.	9in. x 9in.
12/14	90	8ft. 4in.	5ft. 8in.	5ft. 6in.	3ft. 0in.	5ft. 0in.	14in. x 14in.
13/14	135	9ft. 1in.	6ft. 10in.	6ft. 0in.	4ft. 0in.	6ft. 9in.	14in. x 14in.

*Buckstays are not supplied for 14/9 Type.

Note.—If required, Patent Bell Flue can be installed with above Models.

(Continued on next page)

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Goodrid Chimney-Fed Incinerators

Goodrid Chimney-Fed Incinerators are made in three sizes, as listed in Table 2. Reference to the illustration of Model C.C.2 will show the general construction of the Goodrid Chimney-Fed Incinerator. The combustion chamber is built directly under the chimney flue, and garbage, when fed through hopper doors above, falls directly into same. When firing incinerator the main chimney is closed by means of heavy C.I. damper and gases rising [illegible] are diverted through the Goodrid Patent Bell Flue, built over top of Incinerator (see illustrations) and after rising and falling pass into main stack at a point at [illegible] combustion chamber. By this means, the necessary [illegible] required to completely destroy garbage is retained in combustion chamber and soot nuisance is eliminated.

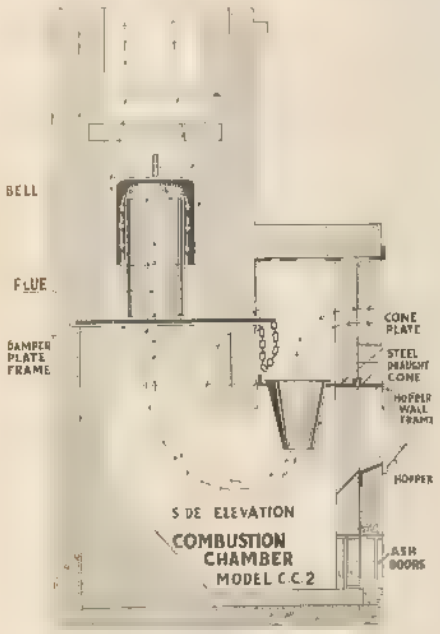


TABLE 2

STANDARD SIZES FOR "GOODRID" INCINERATORS FOR FLATS

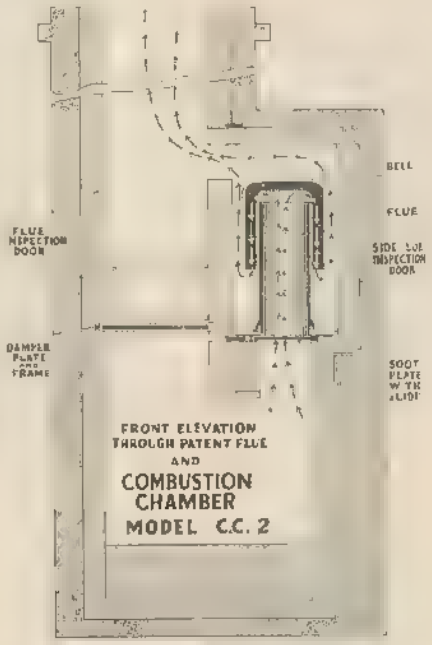
Patent Nos. 18480, 15033, 28365

Model	No. of rooms up to	Overall Sizes			Inside Dimensions Flue
		Length	Width	Height	
C.C.1	10	4ft. 7in.	3ft. 10in.	6ft. 6in.	14in. x 14in.
C.C.2	50	5ft. 0¾in.	5ft. 0¾in.	7ft. 8¾in.	18in. x 18in.
C.C.3	80	5ft. 10in.	5ft. 0¾in.	8ft. 0in.	18in. x 18in.

Note.—Patent Bell Flue included in these Models.

Guaranteed Satisfaction

That Goodrid Incinerators provide economical, efficient disposal of garbage and refuse is best attested by our many installations operating under widely varying conditions. The approval of leading architects and engineers, and the recommendations of our users, warrant our assertion that there is not a garbage and refuse disposal problem which cannot be solved by some type of Goodrid Incinerator. General satisfaction assures that the service we are rendering to others is our best recommendation to you.



Installation

Goodrid Incinerators can be installed either by the building contractor or by the Goodrid trained Incinerator staff. In those cases where the building contractor installs we supply all necessary Iron and Steel parts, together with plans and specification.

Goodrid Utility Type Incinerators

Utility types have been largely installed in Schools, Hospitals, Hotels, Theatres, Private Residences, or any place where waste is not too bulky. Installation can be made in any convenient position at a low cost. For dimensions and capacities see Table 3.

TABLE 3

STANDARD SIZES FOR "GOODRID" TYPE INCINERATORS

Model	Capacity cu. ft. per hr.	Overall Sizes			Fire Chamber		Inside Dimensions Flue
		Length	Width over Buckstays	Height	Width	Length	
Utility 1	30	4ft. 3in.	3ft. 9½in.	5ft. 3¾in.	2ft. 8½in.	2ft. 3½in.	9in. x 9in.
Utility 2	40	5ft. 0in.	3ft. 9½in.	5ft. 3¾in.	3ft. 5½in.	2ft. 3½in.	9in. x 9in.
Utility 3	50	5ft. 0in.	4ft. 6in.	5ft. 3¾in.	3ft. 5½in.	3ft. 0in.	9in. x 9in.

Note.—If required, Patent Bell Flue can be installed with above Models.

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35 p

S.A.A. File No.

AUSTRALIAN METAL PRODUCTS PTY. LTD.

GENERAL OFFICE AND PLANT

Rear NICHOLSON and SCOTCHMER STREETS
FITZROY, VICTORIA

NTERSTATE DISTRIBUTERS.

SYDNEY: H E. McClelland, 55 York Street.
BRISBANE: Messrs. Bernays & Anderson, 125 Adelaide Street.
ADELAIDE: Messrs. George Wills & Co. Ltd., "Gilbert House," Gilbert Place.
PERTH: Messrs. George Wills & Co. Ltd., 156 St. George's Terrace.

DOWELL

[For Other Products, See Index]

"Dowell" Metal Fly-Screens

These fly-screens are specially designed for Casement windows of metal or wood. They combine simplicity with economy, and have solved the problem of effectively screening Casement windows.

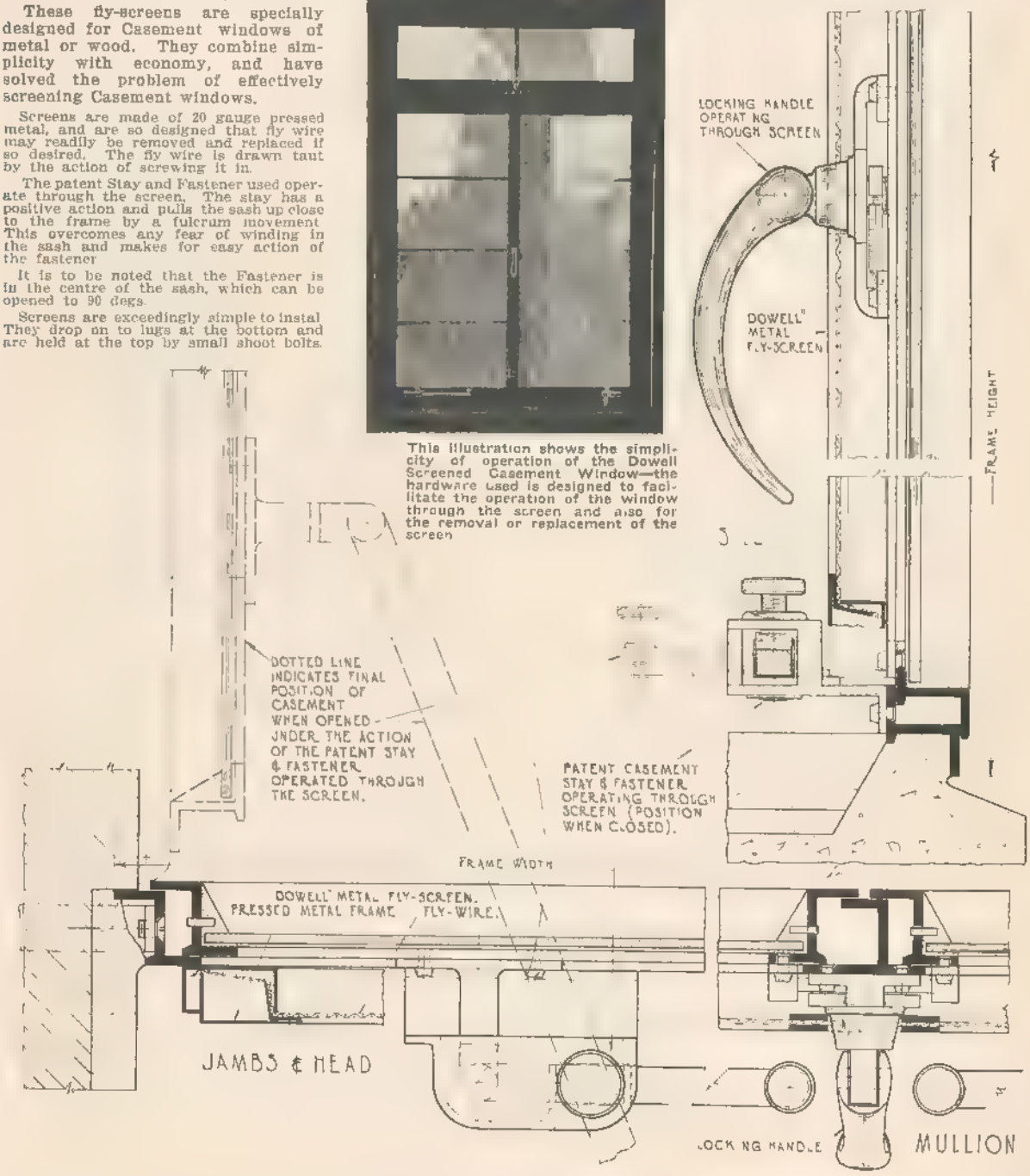
Screens are made of 20 gauge pressed metal, and are so designed that fly wire may readily be removed and replaced if so desired. The fly wire is drawn taut by the action of screwing it in.

The patent Stay and Fastener used operate through the screen. The stay has a positive action and pulls the sash up close to the frame by a fulcrum movement. This overcomes any fear of winding in the sash and makes for easy action of the fastener.

It is to be noted that the Fastener is in the centre of the sash, which can be opened to 90 degs.

Screens are exceedingly simple to instal. They drop on to lugs at the bottom and are held at the top by small shoot bolts.

This illustration shows the simplicity of operation of the Dowell Screened Casement Window—the hardware used is designed to facilitate the operation of the window through the screen and also for the removal or replacement of the screen



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B.R.G.

THE AUSTRALIAN REINFORCED CONCRETE ENGINEERING COMPANY PTY. LTD.

Head Office: NORMANBY CHAMBERS, CHANCERY LANE, MELBOURNE
Works: SUNSHINE, VICTORIA, AND STRATHFIELD, N.S.W.

Agencies: SYDNEY, BRISBANE, ADELAIDE, PERTH, HOBART, NEW ZEALAND

35p

B.R.G. ROLSCREENS

Having recently acquired from the Rolscreen Co., of Pella, Iowa, U.S.A., the numerous Patent Rights of their famous Rolscreen Blind for the Commonwealth of Australia, New Zealand, Java, Straits Settlements and the Islands, we are commencing the manufacture of "B.R.G." Rolscreens at our works at Sunshine, Victoria. As in the past, it is our intention to manufacture a product of marked excellence, to present it truthfully—to follow each installation with sincere interest and to conduct our business relationship in a prompt and efficient manner. We solicit the continued patronage of our numerous clients for this, our next product of manufacture.

B.R.G. Rolscreen Facilities

The first considerations in the designing of B.R.G. Rolscreens have always been that they must be of rigid and durable construction; they must be simple to install and easy to operate. Mammoth presses, intricate rolling machines, and the most modern tool equipment have contributed their part to this, and at the same time they assure accuracy and precision in the manufacturing processes

B.R.G. Rolscreen Features are Patented

Those features which have made B.R.G. Rolscreens practical and have led to their adoption and use by thousands of Owners, Builders and Architects, are exclusive and patented

B.R.G. Rolscreen Guarantee

B.R.G. Rolscreens are guaranteed against defects in workmanship or material and to operate perfectly for over a two-year period. A new screen will be furnished free of charge for any failing under this guarantee. This does not cover damage or abuse to the screen or any other condition beyond the control of the manufacturer

B.R.G. Rolscreen Advantages

Installed on the Inside.—Inside screening has many advantages. The screen stays clean and lasts indefinitely No rain beating through dirty screens on to the window panes. B.R.G. Rolscreens installed on the inside protect the draperies the year round from sooty and grimy sills.

Convenient.—They are easily and conveniently accessible. At a touch of the fingers they are raised for washing windows, adjusting awnings or watering flowers, or stored for a season or a year

Inconspicuous.—They are practically concealed. The special non-rust "AluminA" cloth allows a clear vision. Rather than detract from the beauty of the windows, B.R.G. Rolscreens have been designed to be just as inconspicuous as possible. They can be decorated to harmonise with the window trim

Economical.—The cost of B.R.G. Rolscreens compares favourably with that of good quality wood screens which require special hardware. There is no cost of storing, painting or repairing

Permanent.—They are practically indestructible and may be considered a permanent part of the window. They are always ready for their screening duties.

Materials

Metal.—B.R.G. Rolscreens are constructed of lead-coated terne plate metal, which forms a perfect bond for paint

Wire Cloth. The screen cloth is 16-mesh rust-proofed triple-selvedged "AluminA" especially woven and processed for B.R.G. Rolscreens. It is of a clean grey colour and almost invisible. It has great tensile strength, it is rigid, and it is built up of materials that will not break or crack under continuous flexing The mesh is perfect, sixteen strands to the inch—the ideal weave. It keeps out the smallest insects, yet allows maximum visibility and ventilation.

Springs.—Made of a high-grade oil-tempered steel wire, coiled in our own plant by the most modern automatic machinery, thereby insuring uniform quality

Bearings.—Solid steel

Mandrel.—⅜ in. steel rod.

Housing

B.R.G Rolscreen housing is electrically welded and of very sturdy construction Recessed ends reinforce it and make it rigid. The standard housing is 2⅝ in. square. For openings less than 52 in. high a 2¼ in. housing may be used, and for openings less than 36 in. high a 2 in. housing may be used. For openings over 84 in. high a 2⅞ in. housing must be used

Floating Roller Assembly

A special feature of B.R.G. Rolscreens is the patented "floating" roller. As the screen lowers and the roll of screen cloth grows smaller, the entire roller assembly automatically moves forward. The screen wire cannot drag on the lower edge of the housing and cannot wear out. The entire roller, including the spring, is built in the B.R.G Rolscreen factory. The springs are coiled out of extra heavy oil-tempered wire on automatic machines operated under most careful supervision. After rigid inspection the springs are all thoroughly tested and mounted in the heavy metal roller

Guides

The B.R.G. Rolscreen guides grip lugs fastened in the selvedges of the screen wire and prevent its sagging and bagging. Slotted holes in the attaching flanges allow for adjustment in case of swelling or shrinking of woodwork. Blocks on the ends of the cross-bar are frictionally engaged in the guides. This construction prevents the cross-bar tilting out of the guides and regulates the action of the screen. When the screen is released from the sill it does not fly to the top. The friction in the guides stops it about half way up, where a touch of the fingers can raise or lower it. When installing B.R.G. Rolscreens the cross-bar, as it is drawn down through the guides, acts as a template and automatically adjusts the guides in the opening. Lips at the upper ends of the guides, co-acting with the housing, assure proper, accurate installation.

(Continued on next page)

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Fasteners

When lowered, B.R.G. Rolscreens are automatically locked on the window boards by spring catches, which are unlocked only from the inside. When released, the screen automatically rises about half its length to a point which makes the window easily accessible. A patented vernier arrangement of the catch provides perfect adjustment to the sill.

Friction Angles

When screens are to be built into old work or are to be used with metal double hung windows, they can be mounted by means of the friction angles. These angles are attached to each jamb and support the screen box and frictionally hold the screen guides.

Plaster Channels

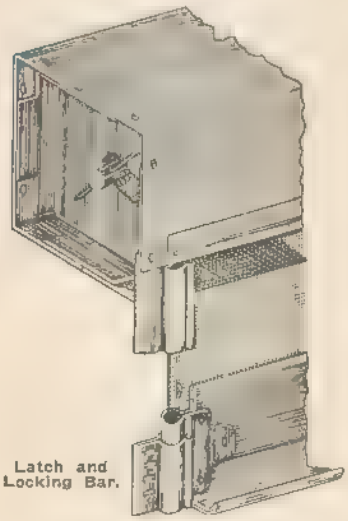
Special channels, which are embedded in the plaster, may be used. B.R.G. Rolscreens are installed quickly without using any wood trim or screws to hold them in place. This installation is simple and very economical.

Metal Mullions

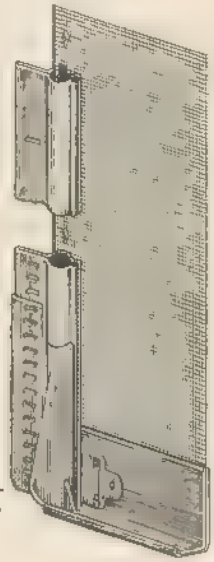
Where openings are over 61 in. wide, mullions must be used. These can be of simple wood construction, or metal mullions can be furnished, as shown on the following page.

B.R.G. Rolscreens are Indestructible

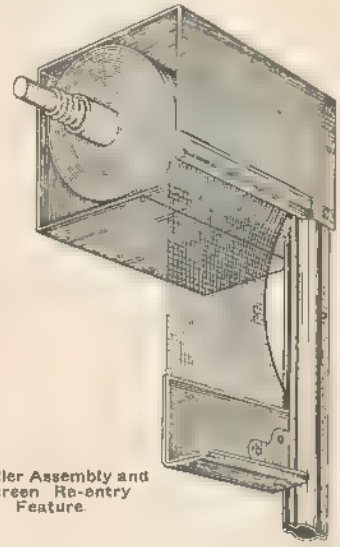
B.R.G. Rolscreens are built to stand up under hard service. If the screen wire accidentally receives a blow hard enough to tear or bag the ordinary screen, the lugs in the selvedges of the screen are released at the sides without injuring the wire. Upon pushing all of the released lugs to the outside, raising the screen and again lowering it, the lugs automatically re-enter the guides, and the screen is stretched in its normal position.



Latch and Locking Bar.



Floating Roller Friction Block.



Roller Assembly and Screen Re-entry Feature.

B.R.G. ROLSCREEN SPECIFICATIONS

A. SCREENS

Screens shall be B.R.G. Rolscreens as manufactured by the Australian Reinforced Concrete Engineering Co., Melbourne, Victoria.

B. WORK INCLUDED.

Note.—List and locate either in schedules on plans or under this heading. If both double hung and casement windows are included, list or schedule each under separate sub-heading.

C.—MATERIALS AND CONSTRUCTION.

1. Metal.—Screens shall be constructed of heavy lead-coated terne plate.
2. Wire Cloth.—Screen wire shall be 16 mesh rust-proofed "AluminA" with triple selvedge. The screen cloth shall have lugs spaced at regular intervals along the two edges which shall be engaged by the tubular guides.
3. Metal Housing and Roller Assembly.—The screen cloth shall be attached to a steel roller encasing a heavy, thoroughly lubricated, oil-tempered spring. The roller shall be contained in a metal housing 2⅝ in. square (2⅞ in. if opening is over 84 in.). Roller mounting shall be of floating type, which allows roller to automatically move forward as size of screen roll reduces, eliminating "drag" of screen wire on lower edge of roller housing.
4. Guides.—The jamb guides shall be so mounted that they are slidably adjustable when the screen is raised or lowered to compensate for any expansion or contraction in the window frame. The guides shall be provided with lips at their upper ends inserted into slots in the roller housing (to assure proper alignment) with the beaded portion cut away adjoining the housing when accidentally knocked out of the guides.
5. Spring Catches.—Spring catches shall be attached to the lower end of the guides, carefully adjusted to automatically lock the cross bar of the screen close to the sill.

D.—WOOD JAMB STOPS.

The wood stops, to which the screen guides are fastened and which support the roller housing, shall be furnished and installed with stop screws and washers by others ready for the screen installation.

Note.—Omit if plaster jamb channels or friction angles are included.

E.—PLASTER JAMB CHANNELS.

Rolscreen guides and housing shall be mounted on plaster jambs in plaster channels set in position before plastering. Channels shall be set absolutely plumb and true on each jamb and accurately on some "full inch" dimension back to back.

Note.—Omit if wood jamb stops or friction angles are included.

F.—FRICTION ANGLES.

Friction angles shall be mounted on the jambs or window as detailed and shall be set true and plumb. They shall receive and hold in position the Rolscreen housing and guides.

Note.—Omit if wood jamb stops or plaster channels are included.

G. INSTALLATION.

B.R.G. Rolscreens shall be accurately installed in strict accordance with the manufacturer's erection instructions. Guides shall be so mounted that the beaded portions and outside edges of guides shall not be in contact with window jambs. Entire installation shall be made so screen operates freely and easily.

(Continued on next page)

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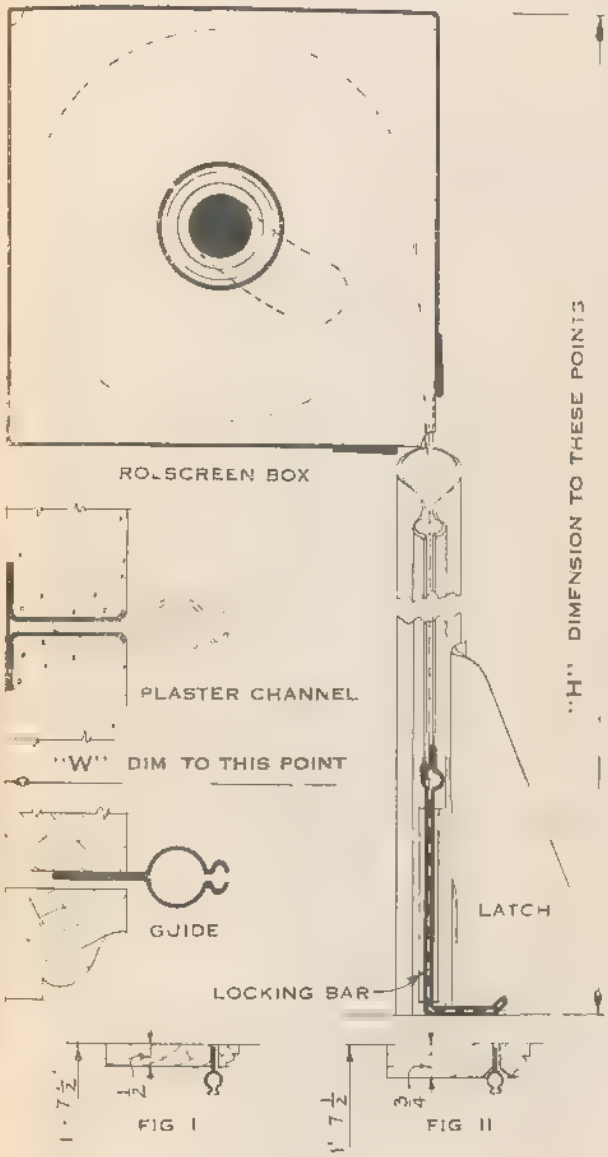
DETAILING INFORMATION

FULL SIZE SECTIONS



"W" and "H" Dimensions.

IMPORTANT NOTE.—If the trim is lowered over the front of the box at the head, at least ½ in. of the lower front side of the box must be left exposed to allow the wire to re-enter when knocked out of guides.

Details

The details shown on the opposite page are only suggestions to be used by the architect as a guide for devising his own details. They are intended to convey the basic idea of B R C Rolscreen installation and the manner in which B R C Rolscreen sizes are determined.

"W" Dimensions.—B R C Rolscreens are made in each "full-inch" width from 11 in. to 5 ft. 1 in., inclusive. Openings wider than 5 ft. 1 in. can be screened by building in simple mullions.

THICKNESS OF STOPS.

Rule I.—If opening measures on the "full inch," i.e., 11 in., 12 in., etc., select Rolscreen with "W" dimensions equal to width of opening, using stops ⅝ in. thick.

Rule II.—If opening measures on the "quarter-inch," i.e., 11¼ in., 12¼ in., etc., drop the fractional measurement, using Rolscreens 11 in., 12 in., etc., respectively, and install with stops ⅝ in. thick.

Rule III.—If opening measures on the "half-inch," i.e., 11½ in., 12½ in., etc., select Rolscreens of the next wider "W" dimension and install, using stops ⅝ in. thick.

Rule IV If opening measures on the "three-quarter-inch," i.e., 11¾ in., 12¾ in., etc., select Rolscreens of the next wider "W" dimension and install, using stops ⅝ in. thick

If stops of uniform thickness are to be used in openings containing fractional inch dimensions, the same result as using thinner stops can be obtained by levelling the corners of stops adjacent to guides. See Figs. 1 and 2.

"H" Dimensions.—The "H" Dimensions can be any length up to 96 in., for widths 1 ft. 7 in. or over; any length up to 75 in., for widths between 1 ft. 1 in., and 1 ft. 7 in., any length up to 50 in., for widths 1 ft. 1 in. or less.

For openings not over 84 in. high the standard 2⅝ in. housing is recommended

For openings over 84 in. high—the special 2⅞ in. housing must be used.

For openings not over 52 in. high the special 2¼ in. housing may be used.

For openings not over 36 in. high—the special 1¾ in. housing may be used.

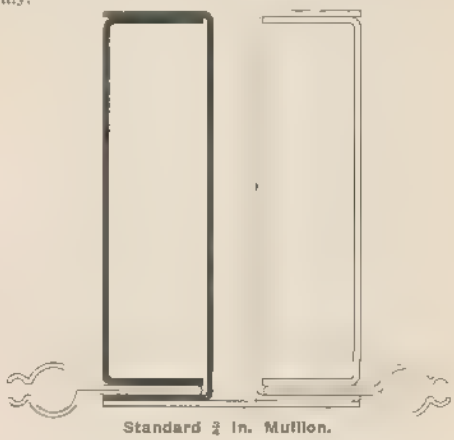
Note.—Due to limitation of spring length, screens from 14 in. wide to 18 in. wide cannot be furnished over 75 in. high. Widths from 11 in. to 13 in. cannot be over 52 in. high.

PLASTER CHANNELS.

When plaster channels are used, great care should be taken to make certain they are set on an exact "full inch" dimension back to back and plumb. Plaster channels are furnished complete by the Australian Reinforced Engineering Company at a slight additional cost; they are carried in stock in lengths up to 96 in.

METAL MULLIONS.

Metal mullions can be furnished by the company for all sizes of Rolscreen housings. Double mullions are used when a screen is to be installed on each side, and are built to any specified width to take up fractions in opening dimensions. Single mullions are used when a screen is to be installed on one side only.



Standard ¾ in. Mullion.

FRICTION ANGLES.

Friction angles are used in new or old construction, and also in metal-jamb windows. They are attached directly to the face of the jamb. They are made in varying depths, so as to adapt Rolscreens of standard size to fractional inch widths. In ordering, give exact opening width, and proper sizes of angles will be furnished

Standard ¾ in Friction Angle.

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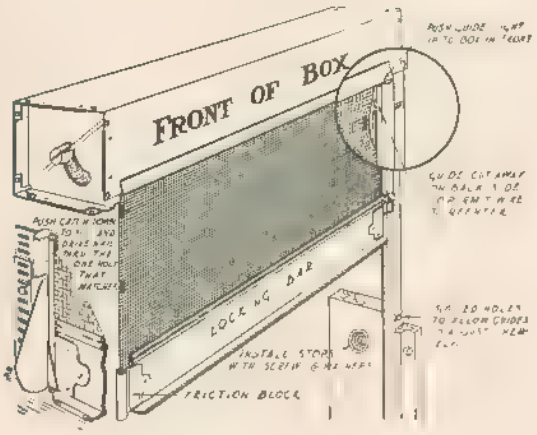
INSTRUCTIONS FOR INSTALLATION OF B.R.G. ROLSCREENS



B.R.G. ROLSCREEN ASSEMBLY

1—Rolscreen box must be centred in opening.

2—Screen stops, on to which Rolscreen guides are fastened and on which box rests, must be exactly 2½ in. wide if 2¾ in. screen box is used; 2 in. wide if 2½ in. screen box is used, and 2¾ in. if 2¾ in. screen box is used. If wider, screen will not work freely.

3—Insert friction blocks into guides, and insert lips on ends of guides into slots in ends of box. Be sure guides fit tight up to box in front. If guides do not fit up close, the screen will not be tight, the screen wire will catch if knocked out of guides and friction block can come out of tip guides at back.

4—Pull locking bar down about three inches, and set flat-headed nails in the top slotted holes of the guides. Pull locking bar on down to the next nails to be set, and repeat operation. This assures the proper alignment of the guides. Allow guides to adjust themselves in slotted holes.

5—Do not crowd trim against front of box. Crowding will push front of box in, and the opening out of which screen cloth unrolls will be closed, causing the screen cloth to bind. Important.—Do not cover entire front side of box. Leave ¼ in. to ⅜ in. exposed.

6—Be sure catches are adjusted so as to hold locking bar tight on sill.

7—Spread screen guides at very bottom at point where spring catches bind. Screen must jump from sill when catches are released.

8—In case screen binds, guides probably need adjustment by either tapping them back into jambs, or prying them out a small fraction. If woodwork is built out around beads on guides, do not let it bind against these beads, as the guides expand and contract as screen is operated.

9—If screens jump too high they can be stopped at any point by driving small nail on back side of guide into each jamb at point where screen is to stop. Drive nail so as to bind guide thus:—

10—If guides are just slightly too long, they can be quickly shortened a trifle by filing down at top at point where guides meet front of box.

SPECIAL CAUTION

Under no circumstances spread guides except at very bottom. To do so will ruin the intended operation of the screen. To make screen operate freely, rub paraffin on jaws of guides, adjust locking bar to guides by gripping between thumb and fingers, twisting slightly, and operating screen briskly entire length several times. Screen is not intended to jump over half its length when released from sill.

CARPENTER-CONTRACTOR—CAUTION PAINTER

Paint Will Ruin The Action Of The Best Installed Rolscreen

UNDER NO CIRCUMSTANCES must paint be allowed to get in jaws of guides, or on the friction blocks of locking bar across bottom of screen. If paint is accidentally applied at these points, wipe off immediately, or scrape off with knife, if paint has dried. Again apply paraffin.

INSTRUCTIONS FOR RE-ENTERING LUGS INTO GUIDES

If screen wire accidentally receives a blow hard enough to tear or bag the ordinary screen, the lugs in the selvedges of the wire will be released at the sides without injuring the wire. To re-enter lugs into guides, first push all of the released lugs to the outside of the guides, raise the screen to the top, again lower it, and all of the lugs will automatically again enter the guides. The guides are cut short on the back side to allow the screen cloth to ride over the guide into alignment on the roller.

If The Screen Does Not Roll Up

1. The wood trim across the head may be set too tight against the front of the screen box, thus reducing the size of the opening through which the wire enters the housing. If this is the case, pry trim away from box to relieve this condition.

2. Rub paraffin on the screen cloth across the entire width of the screen, just under the screen housing, when the screen is in lowered position. Then raise and lower screen rapidly several times. This tends to smooth the inside of the screen housing and allows the screen cloth to flow into it more easily.

If The Screen Does Not Fit Down To Sill

A simple remedy for screen not fitting down to sill tight enough is to bend up the corner of the ledge on the locking bar where it is engaged by the spring catch.

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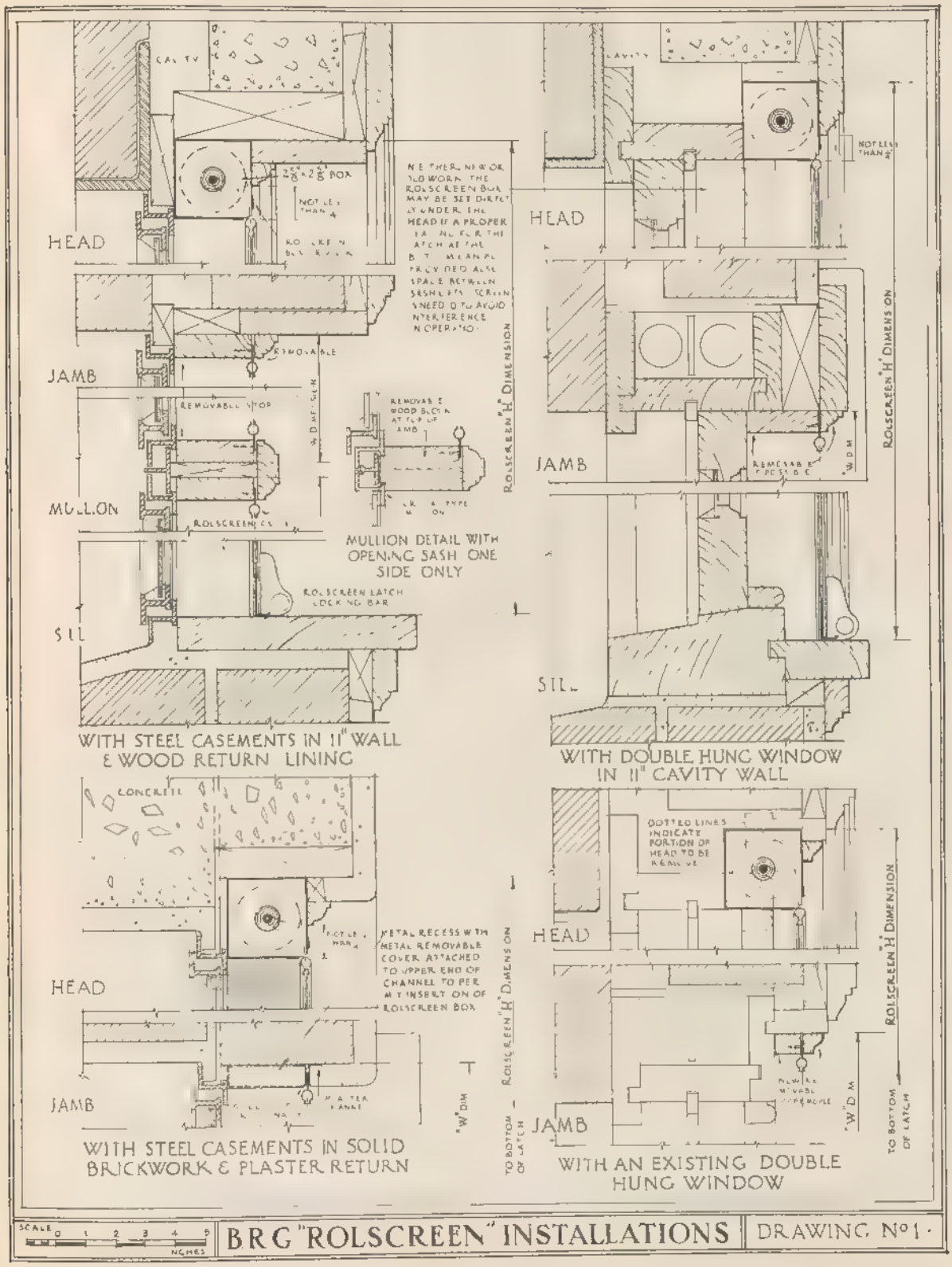

BRC "ROLSCREEN" INSTALLATIONS | DRAWING No 1.

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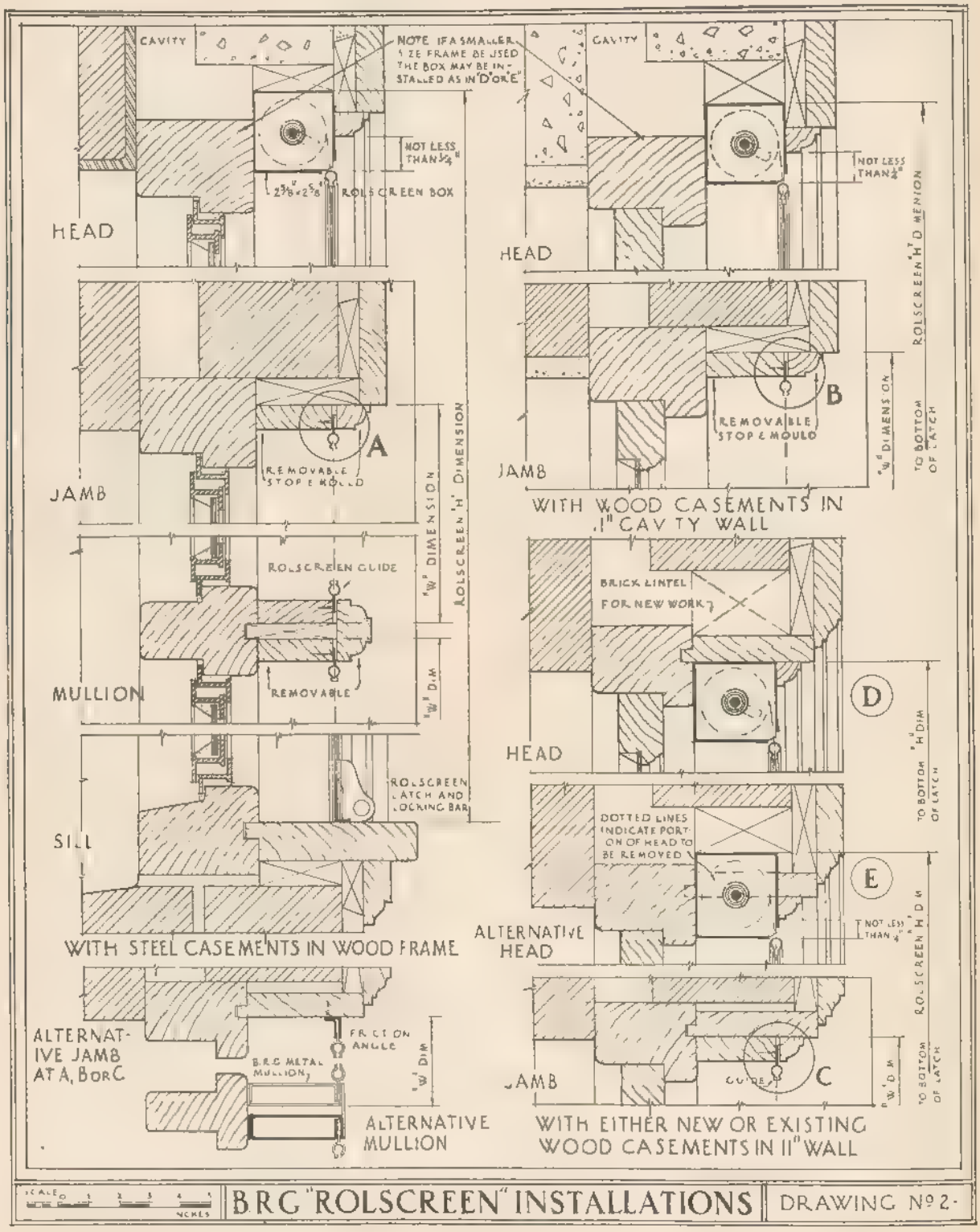

BRG "ROLSCREEN" INSTALLATIONS | DRAWING No 2.

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THE HOUSE FOR CANVAS

THOMAS EVANS PTY. LTD.

415, 417, 419 BOURKE STREET
MELBOURNE

Telephone C. 6986

Manufacturers of Thomas Evans' Shade Cloths

35p

S.A.A. File No.

Products and Service

"Florentine" and Outside Window Shades, Verandah Blinds, Spring Roller Blinds for Doors and Windows, Skylight Shades, and Woven Canvas Fire Hose and all Canvas Goods. A trained staff of experts are ready to install all blinds at moderate charges.

Thomas Evans' Shade Cloths and Blinds

Material

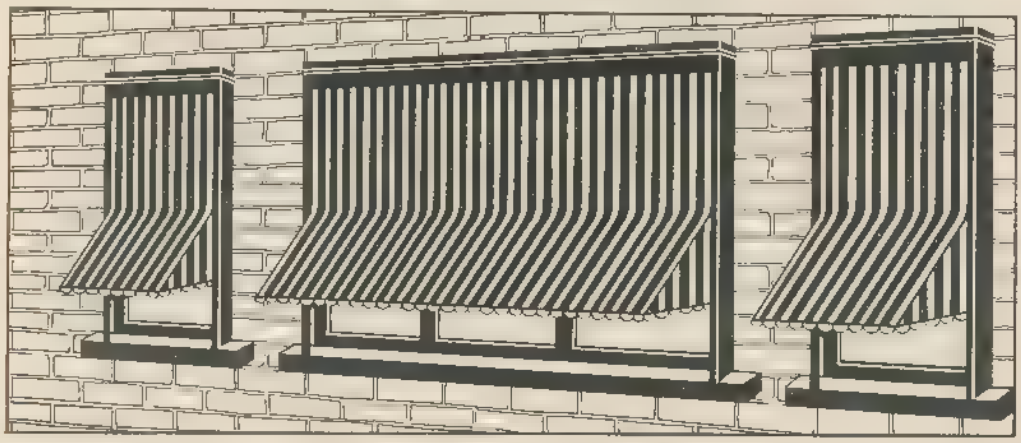
All material used in Thomas Evans' Blinds are of the very strongest and best that can be obtained, in order to ensure long life and lasting service.

Colours and Shades

Strong colours are used for both outside and inside shades. Our wide range of colours ensures satisfaction for all purchasers. Samples will be forwarded on application.

Sizes Available

Verandah Blinds: Width, 3 ft. to 15 ft.; Depth, 5 ft. to 9 ft.
Spring Roller Blinds: Width, 1 ft. 3 in. to 9 ft.; Depth 4 ft. to 9 ft.
"Florentine" Blinds: "Width, 2 ft. 6 in. to 8 ft.; Depth 3 ft. to 7 ft.
Blinds of any measurement can be made to order.



FLORENTINE BLINDS.
The Most Effective Blinds for Shade and Ventilation.

Exterior Window Shades

Exterior shades are a great asset, especially on any windows facing either the north or the west. In both public buildings and private houses much of the discomfort of the strong summer sun can be avoided by the installation of outside blinds made of the strong, serviceable Thomas Evans' shade cloths, striped and shaded in practically any colour that is required.

Florentine Blinds

These renowned blinds protect the room from the scorching rays of the sun and at the same time allow a current of cool air to pass into the room. When not in use they roll up neatly and easily. The fittings are shown in detail in the accompanying drawing, and it will be noticed that the box at the top, while acting as complete protection to the blind, can be adapted to any style of architecture.

Verandah Blinds

Thomas Evans' verandah blinds have become famous for their excellence and completeness. The experience of many years has enabled us to give absolute satisfaction with respect to the texture and colour of the canvas used, and also as regards the fittings. Unless verandah blinds are correctly cut and fitted, they are liable to sag, become noisy, and wear very quickly. Great care should therefore be taken when forwarding measurements. An expert staff is always ready to advise clients and install the blinds if desired.

Awnings for Shops, Clubs, Hotels, Etc.

Awnings for large terraces at hotels, clubs, etc., are a very important factor in the comfort of guests and members, while a disappearing awning for shop fronts is not only a protection to the goods in the window and intending purchasers, but also considerably enhances the appearance of the shop. Complete specifications will be furnished on application.

(Continued on next page)

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

Spring Roller Blinds

All Thomas Evans' Spring Roller Blinds are made of the best Blind Holland, mounted on Hartshorn's Rollers. Samples will be supplied on application, and blinds can be obtained in the following colours: *cream, green, blue, nigger brown, brown, red or beige.* When ordering, the width of the cloth and pin measurement should be stated.

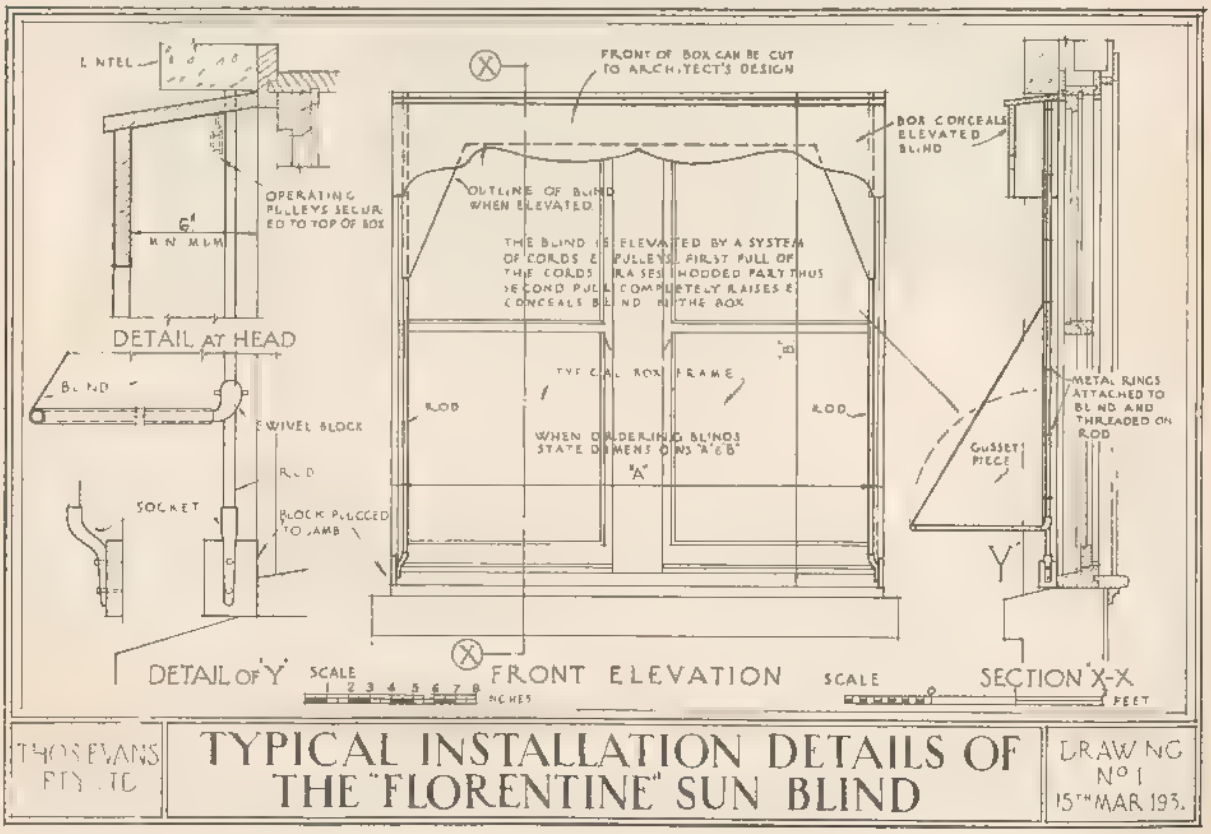
Skylight Shades

Skylights are of great value for lighting, but very often they offer a large expanse of glass to the sun's rays, which, in summer, creates great heat within the room. An effective shade will give a soft diffusion of light instead of the strong glare.

Woven Canvas Fire Hose For Installation in Buildings

We are sole suppliers of the world famous "Camel" and "Monsoon" Woven Canvas Hose. The "Camel" will withstand a pressure of 650 lbs. per square inch, and the "Monsoon" a pressure of 375 lbs. per square inch. The "Camel" hose as used by the Melbourne Fire Brigades and the Country Fire Brigades, is made in 2½ in. only. The "Monsoon" Hose is made in all sizes from ¾ in. to 3 in. diameter, and the 2½ in. size is a standard quality for installing in buildings. It will pass the Fire Brigades Tests.

Spring Roller Window Blinds.



From the collections of Sydney Living Museums / Historic Houses Trust of NSW

K-L

GEO. W. KELLY & LEWIS PTY. LTD.

ENGINEERS

Office:
COLLINS HOUSE, 360 COLLINS STREET, MELBOURNE

Works:
SPRINGVALE, VICTORIA

Sole Representatives:
N.S.W.—Alfred Snashall Ltd., 85 Pitt Street, Sydney.
S.A.—E. Trelivving, T.T. Buildings, Light Sq., Adelaide.
QUEENSLAND — Alfred Snashall, Anthon, Pty. Ltd., P.O. Box 284D, Brisbane
W.A.—Atkins (W.A.) Ltd., 894 Hay Street, Perth.

36

S.A.A. File No.

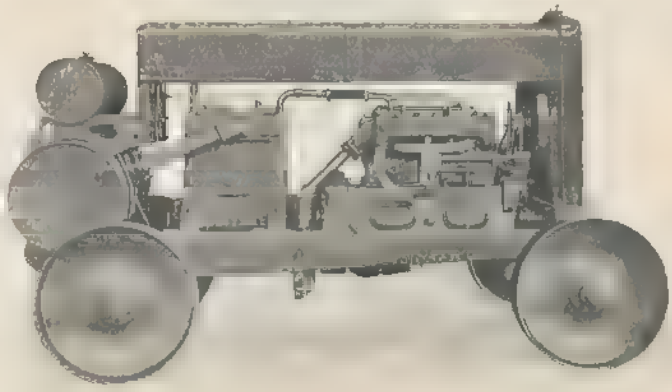
[For Other Products, See Index]

PRODUCTS

Air Compressors — both portable and stationary.
Internal Combustion Engines and Special plant.

SPECIAL FEATURES

- Fuel oil and air pipes copper
- Non leaking brazed connections
- Extra large Turntable bearing
- Chassis Frame, one-piece steel casting
- Alemite grease lubrication
- 3-inch axle
- Renewable radiator section cores
- Ricardo cylinder head
- Unbreakable valve seats
- Clay action unloader
- Large filling cap and strainer
- Extra large air receiver
- Non-leaking Westinghouse flanged cocks
- Wide type pressed steel disc wheels
- Positive full force feed lubrication throughout



"K.L."
Portable
Air Compressor
Type V-2J,
Model 28.

Uses for Air Power

Once an Air Compressor is available, its limit of work is found to depend only on the ingenuity of the user in selecting new labour-saving appliances.

Here are some of the best-known uses for air power:

DEMOLITION WORK.—On roads and buildings it is speedy, safe and cheap.

CONSTRUCTION WORK.—Drilling steel, wood boring, riveting, caulking, tamping, hoisting, grinding, air blast for furnaces, pile driving, etc.

RENOVATING. Buildings, pipe work, castings, etc., by means of sand blast or wire brushes.

PROCESS WORK. Operating pneumatic presses, aeration, displacement of fluids, pneumatic injectors.

PAINTING — applied by air power, fills every crack or irregularity and thus imparts an added finish and durability to the surface.

Time and much money can be saved by employing Air Power.

A FEW USERS OF "K. & L." AIR COMPRESSORS

- Sydney Water Supply, Sewerage and Drainage Board — Stationary horizontal type.
- Public Works Department, Sydney — Stationary horizontal type.
- State Quarries, N.S.W. — Stationary horizontal type.
- Melbourne & Metropolitan Board of Works (Water Supply) — Stationary steam drive horizontal type.
- Williamstown Town Council. Stationary horizontal type.
- State Rivers and Water Supply Commission—Portable horizontal type.
- New South Wales Railways—Stationary horizontal type.
- Federal Capital Commission—Portable vertical type.
- Main Roads Board, N.S.W. — Portable vertical type.
- Sydney City Council—Stationary horizontal type.
- Bendigo Sewerage Authority—Vertical portable type.
- Victorian Railways. Horizontal stationary vertical compound.

"K.L." Stationary Air Compressors

The "K.L." Stationary Air Compressor is of the straight line, single cylinder type. It is a self-contained machine, completely enclosed and automatically lubricated. It is fitted with two heavy flywheels, one of which is adapted to take belt drive.

Direct Steam Driven Type

Where a supply of steam is available, this type of compressor is recommended, being compact and efficient, having no belt or other drives to take up space and absorb power.

The compressor is arranged for a direct steam drive, with a steam cylinder interposed tandem between the main frame and the air compressing cylinder.

Stationary Horizontal Compressor

(Continued on next page)

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

Internal Combustion Engines

The Model "30" "K.L." Internal Combustion Engine is the result of over twenty years' experience in designing and manufacturing this type of engine, and this model has been placed on the market only after exhaustible testing under scientifically controlled conditions.

This engine is supplied in either 2, 3 or 4 H.P. sizes, and can be arranged for Hopper or Tank Cooling, for belt or chain drive, and for direct coupling to almost any type of machine.

The engine will run on either petrol or kerosene by suitably adjusting the carburetter.

The engine is of very neat design, the materials used are the best of their respective kinds and workmanship is of the highest grade throughout, thus ensuring a long life machine.

Model "30" Petrol-Kero Engine.

SPECIFICATION.

Cylinder.—The cylinder and upper half of crankcase are formed in one casting of Alloy Iron, which ensures an extremely smooth cylinder surface by grinding to close limits. The crankshaft is carried in the upper half of crankcase, running in high-pressure die-cast bearings.

Base. The lower half of crankcase forms the oil sump and is provided with an oil gauge.

Cylinder Head and Valve Gear.—The cylinder head, of special non-detonating type, is water-jacketed and fitted with correctly designed inlet and exhaust ports. **Valves** are in the head and operated through high tensile bronze rockers, fitted with hardened steel tappets, by steel push rods.

Crankshaft Connecting Rod and Piston.—The **crankshaft** is specially balanced and of high-grade steel, drop-forged, and ground to close limits.

Connecting Rod is or H section high-grade steel, drop-forged.

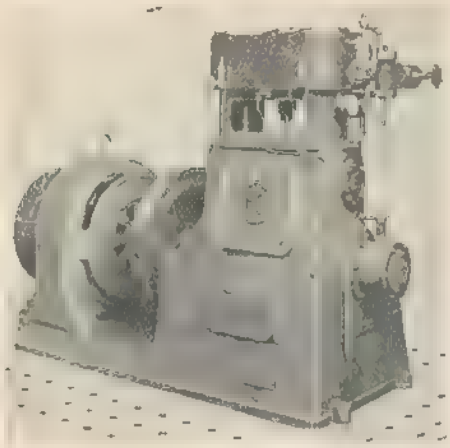
The Piston is of "Alloy Iron," ground to fine limits and provided with three piston rings.

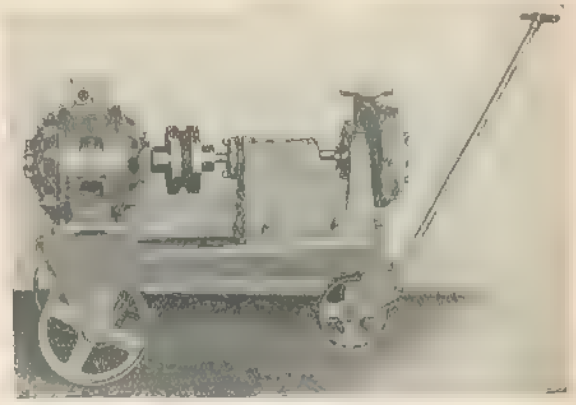
The Gudgeon Pin, of full floating type, is of high-grade hardened steel, ground to fine limits.

Camshaft and Gears.—Of fine quality drop-forged steel, cams integral with shaft. Gears are of drop-forged steel, helically cut.

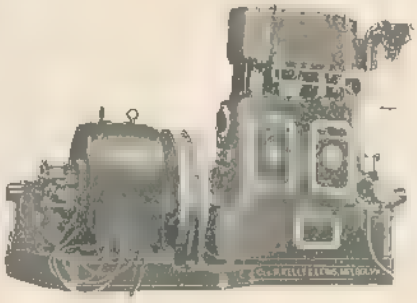
Governor and Magneto Unit.—Governor is of centrifugal type, totally enclosed, and adjustable from outside while engine is running. **Magneto** is of British manufacture, high-tension, rotary type.

Carburettor.—Metal float type, with sliding choke tube and extra air control.





Portable Pump and Electric Motor Unit.



Vertical High-Speed Direct-Coupled Generating Sets.

High-Speed Steam Engines and Generating Units

Geo. W. Kelly & Lewis Pty. Ltd. have had considerable experience in the manufacture of high-speed steam engines, and have a number of very successful installations to their credit.

Illustrated are some high-speed engine-driven generating units. They are of very neat design, both internally and externally, a feature of all K. & L. products.

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

SECTION V

[Containing S.A.A Filing Section No. 37]

INSULATION

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

37a

S.A.A. File No.

INTERNATIONAL FIBRE BOARD LTD.

OTTAWA, CANADA

Mills at:

MIDLAND, ONT., CANADA. GATINEAU, QUE., CANADA.

Australasian Agents:

QUEENSLAND: Butler Bros., 119 Creek Street Brisbane

NEW SOUTH WALES & MANDATE ISLANDS—Crockett & Corke Ltd., 379 Kent Street Sydney.

SOUTH AUSTRALIA—J. A. Rowe, 1 Insurance Chambers, Pirie Street, Adelaide.

WEST AUSTRALIA—W. Drabble Ltd., Bay View Terrace, Claremont.

VICTORIA, TASMANIA } R. S. Couche & Co. Pty. Ltd., 386 Flinders Lane, Melbourne.

NEW ZEALAND—Th. de Schryver Ltd., N.Z. Insurance Bldgs, Auckland.

Distributors and Dealers in all Principal Cities throughout Australia and N.Z.

TEN/TEST

TEN/TEST, A DIFFERENT INSULATING BUILDING BOARD

What Ten-Test Is

Ten Test is made from the fibres of Canadian spruce specially prepared by a series of exacting processes, and formed into a strong, tough, durable board under a hydraulic pressure of 2,000 tons. It is solid—not laminated. It is produced in a single board of any desirable thickness not built up layer by layer to meet the required size.

This process provides the best insulation obtainable —no matter what thickness of Ten-Test is used, there is nothing in the board to detract from its insulating qualities.

Briefly, Ten-Test consists of non-heat-conducting and waterproofed spruce fibres surrounding millions of tiny air cells that successfully resist cold, heat and sound. It comes in individually manufactured sheets of the dimensions in the following schedule:—

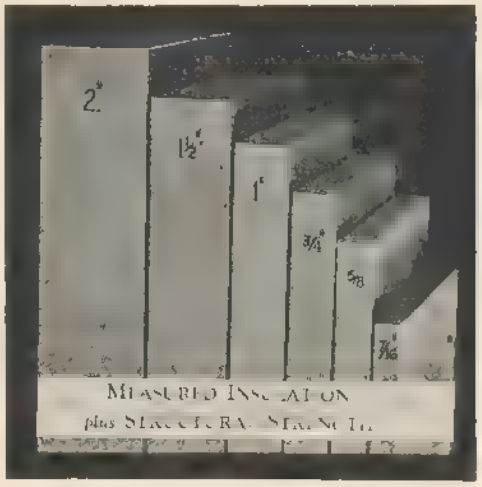
Available Sizes

Thickness	Width feet	Length feet	Wt.*
7/16	3 or 4		79
5/8			113
3/4	"	6 8 8	135
1	4	10 12 14	180
1½			270
1¾			315
2			360

*Approx. per 100 sq. feet.
Lengths up to 17 feet can be supplied if desired.

A New Thought in Building Construction—Measured Insulation

Ten Test insulation gives the architect and builder a definite standard by which they can determine accurately the exact thickness of insulating board for any job. Thus the number of standard thicknesses (up to 2 in.) in which Ten-Test is made makes it possible to select just the right degree of insulation for any condition, whether for sheeting, floors, roofs, walls or refrigerator insulation. Thus Ten-Test truly offers measured insulation.



TEN-TEST INSULATION THAT IS MEASURED FOR EVERY INSULATION NEED.

Ten-Test is Not a New Insulating Board

While different from other insulating boards, Ten-Test is not new in the sense of being untried. For twenty years it has been used as insulation for dwellings, industrial plants and public buildings—for sheeting, insulating flooring, roofs and walls. Under all atmospheric conditions, its solid, yet cellular spruce fibre construction has provided the highest degree of insulation, combining plastic bonding qualities with great structural strength.

Ten-Test was selected for the construction of the Canadian Building at the Wembley Exposition. It was used in the Bank of England (both old and new buildings), the Royal and Ancient Golf Club, St. Andrew's, and the King's Reviewing Pavilion at Aldershot. The War Office, the Admiralty and the London County Council are regularly using Ten-Test in construction work. Ten-Test was also used in the construction of the Royal York Hotel, Toronto, Sun Life Insurance Building, Montreal, Montreal Stadium, Toronto General Hospital, the New Zealand Government Building, and numerous commercial and residential buildings throughout New Zealand, Canada, England, Africa, U.S.A., France, China, Japan and Australia, a brief list of important Australian examples being given on one of the following pages.

Official Tests

I—CONDUCTIVITY

Ten-Test has a conductivity of 0.324 B.t.u. per hour per sq. ft. per degree Fahr. per 1-in. thick. Authority Prof. E. A. Allcut, M.Sc., M.I., of the University of Toronto.

II—TENSILE STRENGTH

228 lbs. per sq. in. Tests made on 7/16 in. board cut to strips 1 in. wide and tested in a Riehle Tensile Testing Machine, the grips being 2 in. apart.

III—TRANSVERSE STRENGTH

Equal deflection) is 28.4 lbs. Tests made on 7/16 in. board 6 in. wide, 18 in. long on 12 in. centres, and load applied to breaking point.

IV—PLASTER BONDING STRENGTH.

1,340 lbs. per sq. ft. Ordinary wood fibre plaster applied to standard 7/16 in. board, and pull registered in an Olsen Testing Machine.

V—PORTLAND CEMENT STUCCO BOND

Tests by Canadian Pozzolana Co. Ltd., Toronto—After 2 weeks' set, cement stucco could not be separated from Ten-Test when broken up with a 6-lb. hammer.

VI—MOISTURE RESISTANCE

Ten-Test, after complete immersion in water, registered 23.7 increase in weight. The waterproofing in the fibres is responsible for its resistance to moisture.

VII—SOUND ABSORPTION

Co-efficient of absorption of 7-16 in. Ten-Test is .35. Authority Prof. G. R. Anderson, of the Toronto University.

Note. Authority for Tests Nos. II, III, IV and VI: J. T. Donald & Co. Ltd., Chemical Analysts and Engineers, Montreal, Quebec.

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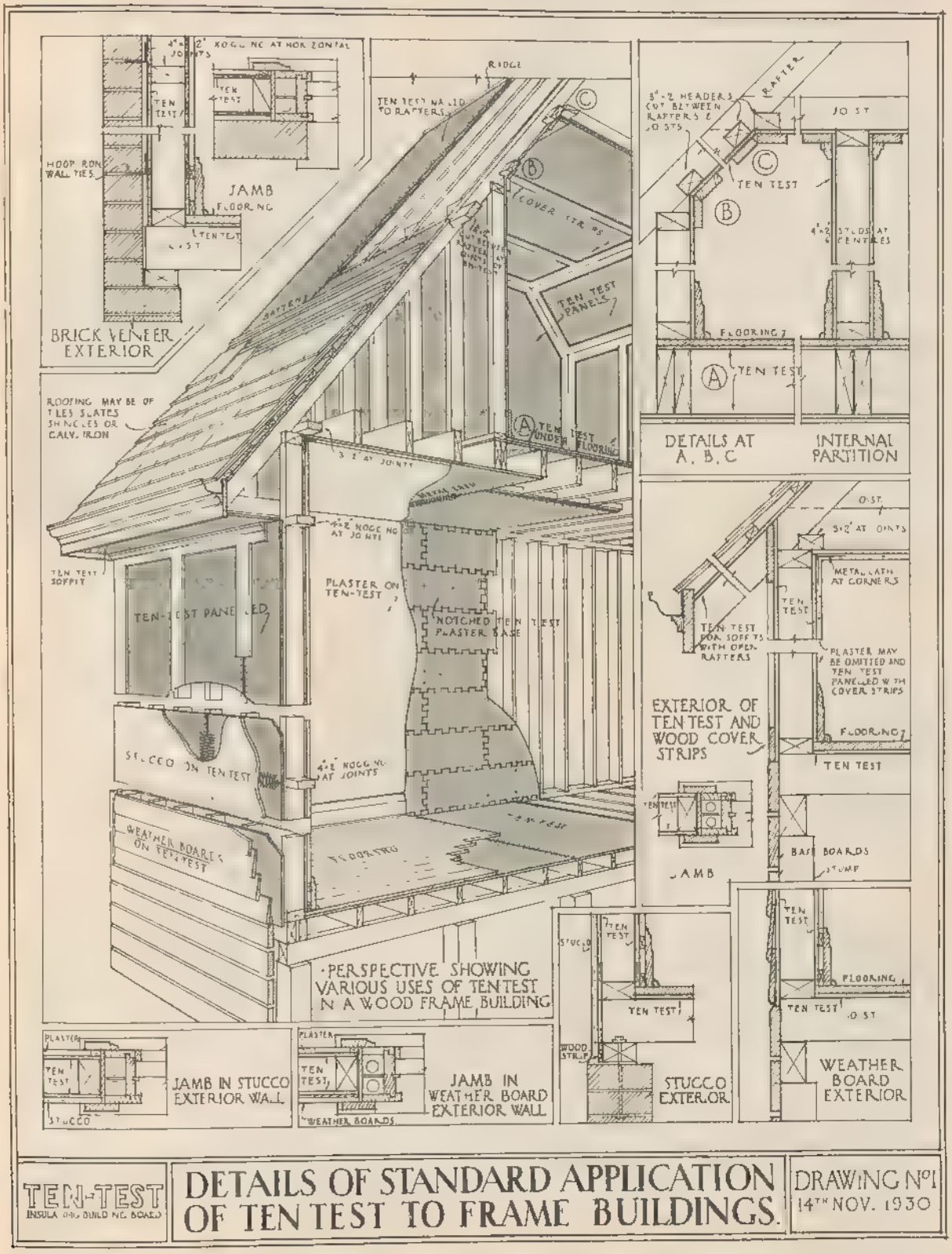

(Drawn by the Architectural Staff of Ramsay's Catalogue)

(Continued on next page)

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TEN-TEST AS EXTERIOR SHEETING AND INTERIOR WALL AND CEILING BOARD

Ten-Test Will Take Any Exterior or Interior Finish

Stucco, plaster, weatherboards, paint and wood cover strips, brick veneer on the outside and paint, plaster and special finish on the inside, have all been applied to Ten Test with unvarying success for many years In addition, it establishes one of the strongest bonds with plaster without the use of metal laths except at joints and corners

Ten-Test as Exterior Finish or Sheeting Under Weatherboards, Stucco or Brick Veneer.

Ten-Test is unusually well suited to all sheeting purposes, regardless of what the exterior of the building is to be—brick, stucco, weatherboards, or just paint and wood cover strips. Applied directly to studding, it provides positive insulation against cold, heat and sound, and supplies greater wall strength than ordinary weatherboards afford.

Structural framing for Ten Test boards should follow the ordinary practice, the studs, joists and rafters being framed in the usual manner. Ten-Test boards should be applied lengthwise, parallel to studs, joists and rafters, directly to the framework, and set in place so as to have a bearing for nailing along all edges. Boards should be tacked in place as closely as possible without crowding.

Plaster and stucco can be applied directly to Ten-Test without the use of metal lath, except at corners or intersections. If metal lath for external work is desirable, Ten-Test sheeting boards should be covered with heavy-weight building paper, and the surface thus formed provided with battens to receive metal lath. If self-furring metal bases are used, the battening is not necessary, the lathing being fixed with staples which pass through Ten-Test into studs.

Ten-Test as a Wall and Ceiling Board

Ten-Test is an ideal material for use as wall and ceiling board, as its well-sanded finish and well proportioned panels offer a wide range of possibilities for a unique, decorative scheme without additional finishes. In addition, its extraordinary bonding qualities provide a perfect base for any applied finish such as wallpaper, paint, plaster, etc. It will not crack, buckle or warp; it absorbs sound and is vermin-proof

TEN-TEST INSULATION IN THE QUEEN'S LABORATORY, UNIVERSITY OF MELBOURNE

TEN-TEST AS ROOF AND FLOOR INSULATION

As Roof Insulation

Ten-Test meets every requirement as an efficient insulation for roofs. It may be applied over all kinds of wood and concrete decks and under every type of roof covering, such as tiles, slates, shingles and galvanised iron, etc. When so used, Ten-Test saves fuel radiation, prevents condensation, permits the use of smaller heating units, reduces expansion and contraction on concrete roofs, and keeps heat in and cold out in the winter, and the reverse in summer

As Floor Insulation

A further and very important use of Ten-Test is its application to all types of floors. It can be applied to wood and concrete floors in any of the methods illustrated on Drawing No. 2. Its presence in the floors provide two distinct advantages.

First, it places insulation where it is sorely needed, as it eliminates all possibility of cold air draughts at the floor level Second, as sub flooring material, it acts as a sound deadener, which absorbs most of the usual noise present in the building.

As Ceilings

In Commercial Buildings where ceilings of reasonable cost and capable of speedy application, and possessing the properties required for insulation from sound and temperature, prevention of condensation and ability to withstand vibration a ceiling pleasing in appearance, ready for immediate decoration, whether with plain mill white, elaborate distemper, paint or enamel, are desired, the architect may specify Ten-Test with the greatest of confidence, knowing that it contains all the foregoing qualities

On Drawing No 2 there will be found methods of applying Ten-Test ceilings to various types of floor construction.

LIST OF IMPORTANT INSTALLATIONS

Prince of Wales Hospital, Randwick, N.S.W.—Architect: Commonwealth Works Department.

St. John's Church, Brunswick, Vic.—Architect: Louis Williams.

Queen's Laboratory, University of Melb.—Architect: Harry A Norris

The Chalet, Mt. Kosciusko—Architect. N.S.W. State Pub. Works Department.

The Lakes Golf Club, Mascot, N.S.W.—Architects: Wright & Apperly.

Benevolent Home Ballarat, Vic.—Architects. Richards, Coburn & Richards.

Geelong College, Vic.—Architects: Hudson, Wardrop & Ussher.

St. Andrew's Cathedral, Sydney—Architects: Burcham, Clamp & Finch

G.P.O., Sydney: Architect: Commonwealth Works Department

Farmer & Co., Pitt St., Sydney—Architects: Robertson & Marks.

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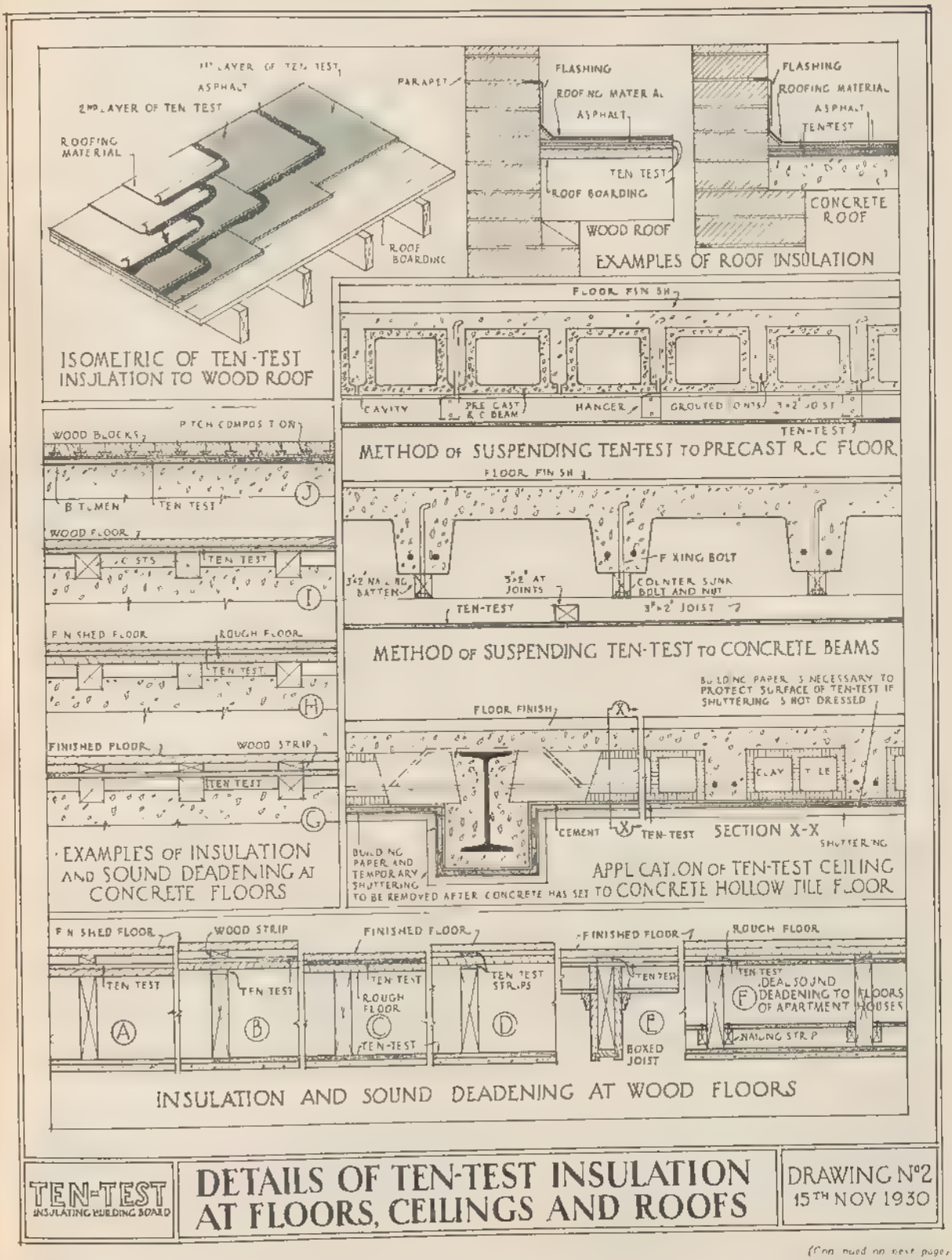

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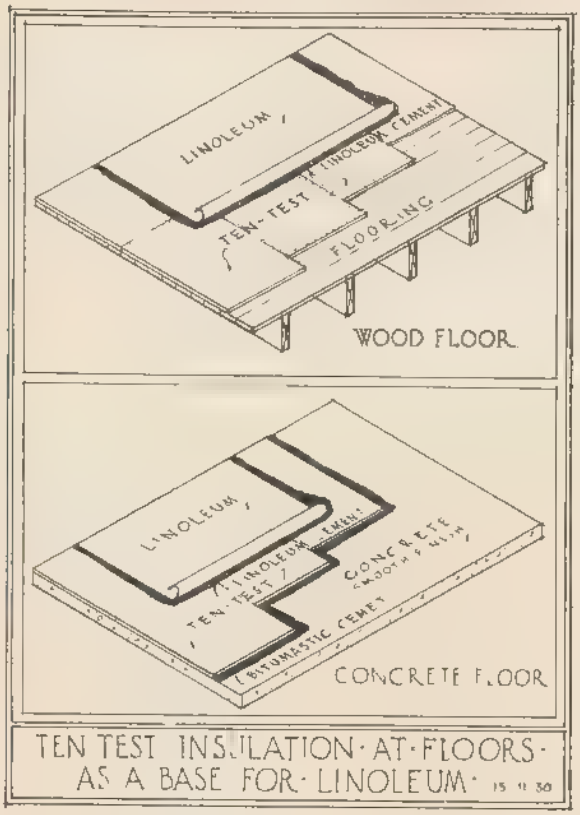

Ten-Test as Plaster Base

The New V-Notch Plaster Base Board

Description and Sizes

Ten-Test Insulating Plaster Base, with its surface that forms a natural bond with plaster, has been developed to meet the demand for an insulating base for plaster Its V-edge is designed to eliminate any open spaces between boards, and provide one continuous wall surface. The patented notch, combined with this unique edge, prevents hairline cracks by eliminating straight, continuous joints The bevelled edge at each notch gives additional bonding surface for the plaster between each sheet. The boards come in two sizes—16 x 35¾ in. and 16 x 47¾ in., for studding at 18 and 16 in. centres respectively

Application

Apply Ten-Test to ceiling first, then on the walls, nailing boards at 6-in. centres with 1½-in. galvanised nails. Place Ten-Test with the smooth face outwards to receive plaster, the grooved edge being uppermost. The boards shall extend lengthwise across studs or joist, the interlocking V-edges making a uniformly tight wall. Break all joints at centres of studs. Reinforce external angles with galvanised corner beads. Cover internal angles with strips of expanded metal lath.

Plastering on Ten-Test Insulating Base

Do not wet Ten Test V-notch Insulating Plaster Base boards before applying plaster. Only recognised hardwall plaster should be used on Ten-Test, and manufacturer's specification followed. Do not use lime plaster, either alone or mixed with gypsum, for the first coat. Apply plaster directly to Ten Test First and second coats together shall not be less than ⅜ in. thick, and must be thoroughly dry before applying finish coat. Derby strokes must be made in the direction of studs and joists, with the derby float spanning two joists or studs. Thoroughly ventilate room.

Ten-Test Boards provide an excellent base for Linoleum The boards are cheaply laid, and effectively cover irregularities of the floor surface. The upper surface of boards remain perfectly level, thus preventing any tendencies of cracking or waving of the linoleum

S.A.A. File No. 37A

AUSTRALIAN ADDRESS
G.P.O. Box 3248P,
Sydney, N.S.W.

CELOTEX

BRAND

INSULATING CANE BOARD

Manufactured by
THE CELOTEX COMPANY
919 North Michigan Avenue,
Chicago, Ill., U.S.A.

MILLS:
New Orleans, La., U.S.A.

CELOTEX STOCKS for prompt delivery are available at all large cities in Australia, New Zealand, and the South Sea Islands. Distributors stock and sell Celotex in hundreds of cities in 85 countries throughout the world.

CELOTEX PRODUCTS

CELOTEX STANDARD BUILDING BOARD.—A highly efficient structural insulation. Used for exterior walls, interior linings, roof and floor insulation and sound quieting Builds walls stronger than weatherboarding galvanized iron, asbestos cement sheets, etc Thickness 7/16th in width 3 ft. and 4 ft., lengths 7 ft., 8 ft., 9 ft., 10 ft., 12 ft and 14 ft. also size 12 ft x 7 ft Average weight 60 lbs. per 100 sq ft, weight crated 72 lbs When ordered in full crates of eight Boards of same length and width, no extra charge for crating

*CELOTEX ROOF INSULATION BOARD—A strong, easily laid Board especially designed for the insulation of flat roofs under all types of roll-roofing or built up roofing. Width 22 in., length 47 in. thickness approximately ½ in. It is also supplied laminated in thicknesses of 2 to 8 ply. Boards packed 14 (½ in.) per crate

*CELOTEX INDUSTRIAL INSULATION BOARD.—Used for insulating oil tanks, dry kilns, ventilating ducts, for form centring, and for other purposes where structural strength is not required Thickness approximately ½ in.; width 3 ft.; length 6 ft Also supplied in Celotex Standard Building Board sizes, on special order. Boards (6 ft. x 3 ft. x ½ in.) packed 17 per crate.

CELOTEX LATH.—An improved plaster base with high insulating value Size 18 in x 48 in x ½ in. and 1 in. thick. Beveled edges all round reinforce the plaster The two long edges are ship-lapped. Delivered in bundles. Boards (½ in.) packed 60 per crate.

*HALF INCH CELOTEX CARPET LINING Fabricated by a process which gives great resiliency Adds life to carpets, makes them softer and more luxurious Saves construction costs and carpet cleaning costs and will not mat down. Deadens noise and insulates floors, is clean, sterile odorless Size 6 ft x 3 ft. by approximately ½ in thick. Boards (½ in.) packed eight per crate.

QUARTER-INCH CELOTEX LINOLEUM BASE AND CARPET LINING—By a special process during manufacture, Celotex Linoleum Base is given the correct degree of resilience. Prevents cracked and ruptured Linoleum Deadens noise and insulates floors. Size ¼ in thick, 5 ft wide 3 ft long Boards (¼ in.) packed 32 per crate

*CELOTEX REFRIGERATOR INSULATION BOARD.—Supplied in special sizes to comply with the requirements of builders of Railroad Refrigerator Trucks, Steel Passenger Cars, Household Refrigerators, Ice Storage Houses, etc Thickness ½ in also laminated in thicknesses of 2 to 8 ply

*ACOUSTI CELOTEX A patented sound-absorbing, fibrous material used for acoustical correction and sound quieting It comes from the Celotex mills a finished unit in itself No finishing processes are necessary Its sound-absorption qualities are built in. Used in auditoriums, churches, offices banks etc. See Acoustics Section for details.

Celotex Standard Building Board, Celotex Lath and ¼ in. Celotex Linoleum Base are stocked by most Celotex Distributors in Australia and New Zealand. Celotex Products marked * are available on indent order placed 60 to 90 days before required.

From the basement to the attic Celotex has a definite place in the construction of walls ceilings and partitions. On the outside of buildings as a covering for walls, on its own or as sheathing (exterior lining), under galvanized iron, asbestos cement sheets, weather-boards, rough-cast, or brick veneer Under roof coverings as sarking or roof sheathing As an interior lining for walls and ceilings in its natural finish or decorated or as a base for plaster In these uses Celotex is not only a material of construction it also insulates and quiets sound In roofs, in walls in ceilings in floors (under floorings, or under floor coverings) Celotex not insulates and quiets sound

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TREETEX

HARDWOODS (AUSTRALIA) PTY. LTD.

34 QUEEN STREET, MELBOURNE, C.1

TELEPHONE: C.3855

37a

S.A.A. File No

The practice of insulating buildings of all types is being adopted by architects and engineers to an extent unthought of until comparatively recent years.

The increasing popularity of central heating, as well as the high cost of fuel, have made the conservation of heat a matter of ordinary prudence, whilst it is easily recognised that an insulated building provides far more comfortable conditions in hot weather. In the question of sound, too, it has become essential to suppress the din of modern traffic and other street noises, whilst in buildings such as flats, hotels, or office blocks, the isolation of noises from lifts, typewriters, bathrooms, ballrooms and other sources is of the greatest importance

"Treetex" has been specially designed to meet this need for a really efficient and, at the same time, economical insulating material. It is manufactured in a manner that ensures the highest possible insulation value. The large size and extreme lightness of the units make for speedy application and reduced labour costs "Treetex" has great structural strength. It is extremely durable and is immune from dry-rot, deterioration and insect attack

"Treetex" imposes no limits on the design or decoration of a room as it can be treated in any desired manner, or can be papered. It can also be used as a base for plaster and is far superior, for this purpose, to wood lath.

"Treetex" is extremely efficient in correcting acoustical defects (see page in "Acoustics" Section for further information), and in preventing condensation, and can be used for exterior work.

In order that the most satisfactory results may be obtained, it is requested that you will not hesitate to seek our co-operation when using "Treetex" for any purpose. The acceptance of our services involves you in no obligation whatever.

Sizes and Packing Details

INSULATING WALLBOARD, full ½ inch thick. 8, 10, 12, 14 feet long by 3 and 4 feet wide. Packed 12 sheets per crate. Weight, 55 lbs. per 100 sq. feet.

"Treetex" Products also Include

Insulating Wallboard, ½ inch thick. 8, 10, 12 feet long by 3 and 4 feet wide. Packed 16 sheets per crate.

Carpet Lining, ¼ inch thick. 5 feet x 3 feet and 6 feet x 3 feet Packed 21 sheets per crate.

Plaster Base, full ½ inch thick. 48 inches long x 18 inches wide. Long edges rebated. All edges bevelled. Packed 20 sheets per crate.

Strength Tests

Tensile strength—280 lbs. per sq. in.
Modulus of rupture—407 lbs. per sq. in
Modulus of elasticity -37,400 lbs. per sq. in

Conductivity

266 B.T.U.'s per sq. foot per 1 inch thickness per degree F. difference in temperature per hour

Density

13.1 lbs. per cubic foot.

Where "Treetex" is Used

1. As a building board for interior use
2. As an exterior stucco base.
3. For bonding direct to concrete floors or walls.
4. Flat roof insulation.
5. For the prevention of condensation.
6. For sound deadening partitions, floors and ceilings (see also in "Acoustics" Section)
7. As an insulation medium for refrigerator chambers or cabinets
8. As a carpet lining and lino base.
9. As a plaster base.

"DONNACONA"

GOLLIN & CO. PTY. LTD., 561 BOURKE ST., MELBOURNE

TELEPHONE: C.9120

37a

S.A.A. File No

Donnacona Insulating Board is a manufactured board made from first quality wood and combining great structural strength with unusual insulating value.

Donnacona Board is a product of Price Bros. & Co. Ltd., Quebec, Canada It is used for lining, insulating, sound deadening, as a plaster base, and for exterior and interior finishes.

Donnacona Board has a pleasing rough cast surface of natural buff colour, which is of itself a beautiful finish Any scheme of decoration may be applied — with the rough cast surface or the reverse side of the board allows a choice of decoration. Successful treatment is possible not only on plain colour but also in the more elaborate two tone and stippled effect.

Weight

Donnacona Insulating Board weighs 75 lbs. per 100 sq. feet. It is approximately one-third the weight of ⅜-inch Baltic lining.

Strength

Donnacona Insulating Board is an all-wood product, made from the finest of first-grade wood fibres, moulded under terrific pressure into a strong, firm, homogeneous Building Board. When used as sheeting or lining, Donnacona Board produces a solid, permanent wall of great structural strength and durability.

Water Resistance

Due to the particular process by which Donnacona Board is manufactured, the entire mass of fibre composing it is waterproofed throughout, making it by far the most water-repellent Building Board ever placed on the market. After drying out the structural strength of the board is in no way impaired.

Insulating Qualities
(Heat and Cold).

Donnacona Insulating Board has a thermal conductivity of .33 B.T.U.'S per hour per inch of thickness for a temperature difference of 1 degree F. Expressed in terms of standard building materials, it provides insulation equivalent to 3½ inches of solid wood, 12 inches of brick masonry and 24 inches of concrete.

Tenacity of Plaster Base

So great is the bond existing between Donnacona Board and gypsum plaster that it is practically impossible to separate it from the Board by ordinary means.

Fire Resistance

Donnacona Board is specially treated for fire resistance and may be classed as "slow-burning" material. It will support combustion to a moderate degree when ignited on the edges, but will successfully withstand the onslaught of fire against its surfaces for a considerable period of time

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37*b*

S.A.A. File No

W. H. BREWER

"SILEX" ASBESTOS WORKS

22 BLACKWOOD STREET, NORTH MELBOURNE

Telephone F 2058

"SILEX"

"ZERISTO"

Products

"Silex" Asbestos Removable Steam Pipe Covering; "Silex" Asbestos Composition for Boilers and Steam Pipes; "Silex" Brine and Ammonia Pipe Covering; "Zeristo" Insulating Cork Boards, Granulated Cork for Insulating and Fruit Packing; "Zeristo" Moulded Cord Sectional Pipe Covering, for all cold pipe lining; Machinery Isolation Cork; Cork Board for sound proofing and acoustical correction; Asbestos Liquid Paints.

Insulation

W. H. Brewer has specialised in the development of insulating materials to meet the requirements of various conditions and temperatures that are found in modern engineering practice. Insulation, to be effective and worth while, must have primarily the efficiency to eliminate or reduce heat losses to a practicable and economic minimum. In addition, it must be adaptable to the various conditions under which it is to be used, whether it be in heating and hot water systems, cold storage or refrigeration plants. On this understanding of economy, efficiency and adaptability, W. H. Brewer recommends the following materials.

"Silex" Asbestos Removable Steam Pipe Covering

In order that steam or hot water may reach the farthest point of a heating system with a minimum heat loss, properly insulated pipe lines are of the utmost importance. Badly insulated pipes result in a greater fuel consumption to overcome these reductions in temperature. Heating systems insulated with "Silex" Asbestos Coverings reach a very high degree of efficiency; heat losses are reduced to a practicable minimum, and fuel savings in certain instances are as high as 30 per cent., while efficiency over bare pipe installation is as high as 90 per cent. "Silex" Asbestos Removable Steam Pipe Coverings consist of asbestos fibre and diatomaceous earth, the latter ingredient being used as a binding agent. They are available in sections 2 feet long with canvas cover and metal bands, for standard pipe sizes from ⅜in. to 6in. They are used for insulating either hot water or steam pipe lines. **These sections can also be supplied made up of 85 per cent. magnesia.** This material, however, is not mined in Australia.

(Above)—The standard 2ft. 0in. length of "Silex" Asbestos Removable Steam Pipe Covering—they are simply clipped on over hot water or steam pipes. (Below)—Boiler Room of G. J. Coles & Co. Ltd. Building, 282 Lt. Collins Street, Melbourne. Architect, Harry A. Norris. Consulting Engineer, W. E. Bassett). Note the neat appearance of all pipe lines, boilers, etc. All steam and hot water pipes are efficiently covered with "Silex" Removable Pipe Covering, also all boilers, calorifiers and tanks are finished with "Silex" Plastic Boiler Coverings.

APPLICATION

The sections can be easily applied. They simply are opened out, placed round the pipe and clipped with the metal bands. No protective coat of composition is required unless exposed to weather, when they should be sized and painted or protected by other suitable means.

Brine and Ammonia Pipe Coverings

"ZERISTO"

"Zeristo" Moulded Cork Sectional Pipe Covering is made up in 3 ft. lengths, for standard pipe sizes from ½ in. to 6 in., in various thicknesses from 1 in. to 4 in., [illegible] copper [illegible] and wire and asphaltic paint are supplied with sections ready for fixing.

"SILEX"

"Silex" Patent Brine and Ammonia Pipe Covering consists of several layers of ½in. hair felt treated with a special grade of Bitumen applied to piping with canvas covering and painted.

"Silex" Asbestos Boiler Covering

This composition when applied forms a permanent non-conducting insulating covering to heating boilers, irregular surfaces, fittings, etc. This composition, similar to the material in the Removable Pipe Coverings, is available ready mixed in 5 cwt. casks, or dry in 1 cwt. bags. One cwt. covers approximately 40 sq. cwt. (dry) covers approximately 35 sq. feet, 1 inch thick.

APPLICATION

No special knowledge or skill is required for application. By working to the following instructions, any workman can produce a satisfactory job:—

1. The dry composition requires to be mixed with water to the consistency of mortar. It is then ready for applying.
2. The surface must be hot and free from grease.
3. Take a handful of the composition and merely rub it on the hot surface to be coated, to which it adheres firmly, forming a thin, spongy coating.
4. When dry (which takes place rapidly), put on about half an inch thick of the composition, leaving hollows with tips of fingers. When dry continue the application in corresponding layers till desired thickness is obtained.
5. Having obtained the desired thickness, level off the finishing coat immediately on application with a wooden straight-edge, and finally smooth off with trowel while drying.
6. If it is desired to make the coating waterproof, give it a coat of common size and two coats of paint any desired colour.

"SILEX" ASBESTOS PAINTS

Ready for use, serviceable, durable, of high quality and decorative merit, all colours. Of undoubted reputation (established in 1880), of good covering capacity, in every way a reliable and desirable necessity for protection of buildings, etc., and general work of any description, giving every satisfaction.

COVERING CAPACITY.—One gallon will cover approximately 40 square yards 2-coat work.

CONTAINERS.—"Silex" Asbestos Liquid Paints come in 5 gallon drums, 1 gallon and ½ gallon tins, and in quart and pint tins. The paints are of proper consistency for general use and need only be thoroughly stirred from the bottom before use.

(Continued on next page)

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"ZERISTO" CORK BOARD INSULATION

Cork—An Efficient Insulator

The most effective medium of insulation is universally recognised as that which is in a homogeneous form of minutely sub-divided air-filled cells, hermetically sealed off one from another. Cork, which is produced from the bark of the cork tree grown in Spain, Portugal and other countries of the Mediterranian region, is a natural cellular formation composed entirely of minute cells **containing air so effectively sealed as to prevent circulation from one cell to the other.**

How "Zeristo" Cork Board is Made

Because of the obvious impracticability of the use of cork in its natural state and of the necessity for convenience in application, "Zeristo" Cork Board which is made entirely of cork and retains the natural insulating qualities of cork—is produced in slab form. Granulated cork, sifted to remove dust and fine particles, is subjected simultaneously to pressure and baking. During the process of baking the natural gum of the cork lignifies and forms a moisture proof coating to each granule, and perfect cohesion to the whole mass which is of light, strong and uniform density.

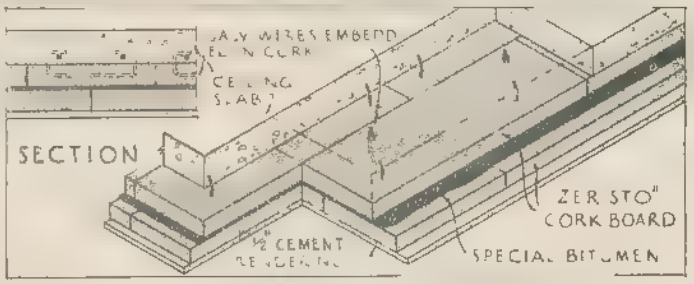
Physical Characteristics

"Zeristo" Cork Board possesses the essential factors necessary in insulating materials. Briefly, these are as follow:—

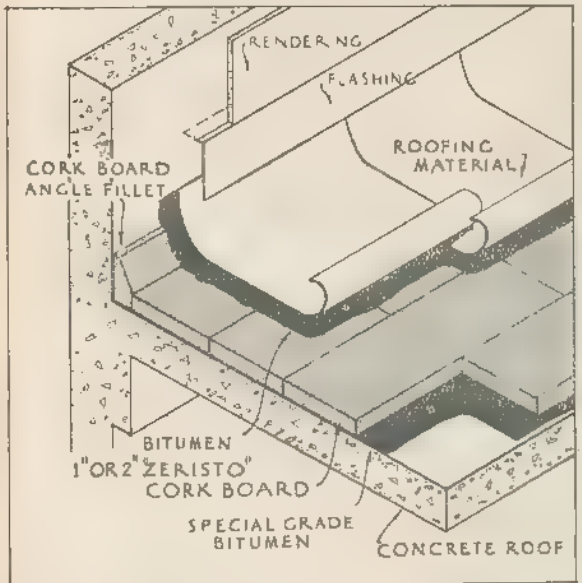
1. LOW DENSITY.—Relatively, the less dense a material, the better its insulating value.
2. THERMAL CONDUCTIVITY .029 B.t.u. per hour, per sq. ft.; per 1 inch thickness; per degree temperature difference. (Melbourne University Test).
3. WATERPROOF. "Zeristo" Cork Board will not absorb moisture either from the air or from damp materials. The gum of the cork which binds the cork granules together is moistureproof.
4. FIRE RETARDANT.—"Zeristo" Cork Board does not support combustion. When in position it is practically fireproof and passes the Fire Underwriters.
5. STABILITY.—"Zeristo" Cork Board DOES NOT shrink or swell with changes of temperature, nor does it disintegrate or break down under service conditions.
6. SANITARY. It will not attract rodents, it will remain indefinitely in its original sanitary conditions.
7. GOOD PLASTER BASE.—"Zeristo" Cork Board is an excellent plaster base.
8. EASY APPLICATION.—"Zeristo" Cork Board can be cut and sawn as easily as timber. It can be speedily erected as shown in the details below. Hickory skewers are used in addition to the Portland cement backing in securing second layer to the first layer. Initial cost is reasonable, and the high insulating efficiency effects substantial economies in fuel savings in heating systems and in the operating of cold storage plants. CONSULT W. H. BREWER IN REFERENCE TO YOUR INSULATING PROBLEM.

SIZE OF SLABS	THICKNESS	WT PER SQ FT	THERMAL CONDUCTIVITY
36 IN. × 12 IN.	1 IN.	1 LB	0.29 B.T.U. PER HOUR, PER SQ. FT PER INCH OF THICKNESS, PER DEGREE DIFFERENCE IN TEMPERATURE
	2 "	1½ "	
	3 "	2¼ "	
	4 "	3 "	

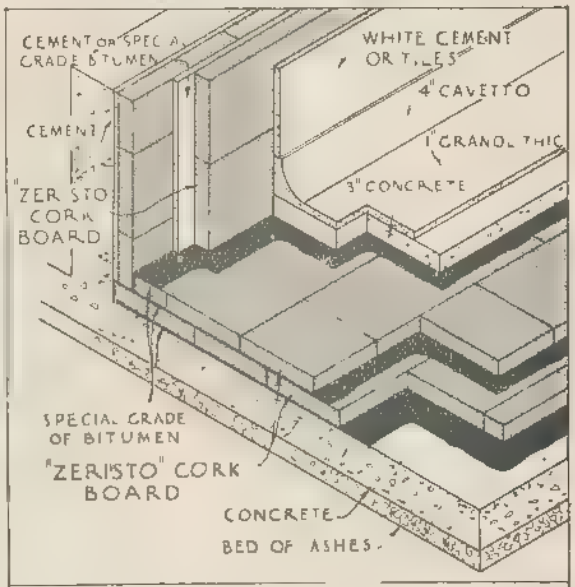
"ZERISTO" CORK BOARD DATA



METHOD OF FIXING AT CEILING



TYPICAL ROOF INSULATION



TYPICAL COLD STORAGE FLOOR AND WALL INSULATION

W. H. BREWER "FLEX" ASBESTOS WORKS — "ZERISTO" CORK INSULATION — BLACKWOOD ST. NTH MELB

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37*b*

S.A.A. File No.

CORK INDUSTRIES (AUST.) PTY. LTD.

GIPPS & WAVERLY STREETS, RICHMOND
MELBOURNE, E.1.

Telephone: J 5136

Australcork

"AUSTRALCORK" INSULATION

"Australcork" is used as a thermal insulation to prevent the entrance of heat, or to maintain cold temperatures in cold storage rooms, freezing and constant temperature rooms.

It is used to eliminate heat losses, as well as to prevent the transmission of the summer's heat through the walls, ceilings and roofs of practically every type of building.

Used on flat roofs, it prevents condensation on the underside of the roof slabs

For machines, it is used as an insulating or isolating medium to reduce permanently the transmission of sound and vibration to an absolute minimum.

Made of pure granulated cork, "Australcork" gives tests equal to the best brands of cork insulation made in England, Europe or America.

We maintain large stocks, and can give effective service in all States.

Non-conduction of Heat

Heat transmission is made by conduction, convection and radiation. Conduction is the most important, especially in cold storage work, because it forms the major portion of heat leakages into the room. The heat conductivity of dense materials, such as metal, brick and concrete, is high, that of materials with lesser density, such as wood, is considerably less; while that of air is exceedingly low. But air is a convector of heat and therefore must be broken up into the most minute particles to effectively minimise the transference of heat by convection currents

It will be appreciated, then, that the following conditions must exist in an efficient insulating material:—

1. Air must be present to prevent conduction.
2. The air must be in the smallest possible particles and each particle hermetically sealed against each other to reduce convection to a minimum.
3. The density of the encompassing material must be very low.

Cork—A Natural Non-conductor

A microscopic examination of cork bark reveals that each square inch contains millions of air cells separated from each other by thin tissues of very low density. These cells are so small that the air is unable to circulate within the material Flow of heat by convection is therefore eliminated to the lowest possible minimum, as the air velocity in such a tiny space is inconceivable. The density of the tissues is so low that the transmission of heat by conduction is lower than any other insulating material known

"Australcork" Pure Cork Boards

"Australcork" boards are made of pure granulated cork compressed into moulds of desired thickness and baked at a moderate temperature for several hours. This process liquifies the natural gum of the cork which acts as a binder and protects the cork slab from moisture. Being made of pure granulated cork, and thus preserving the natural insulating qualities of cork bark, "Australcork" boards must be an excellent non-conductor of heat This quality is evidenced by its low thermal conductivity as under:—

Thermal Conductivity — .29 B.T.U.'s per hr., per sq. ft., per 1 in thickness per degree temperature difference between the sides.

The illustration above shows the method of packing 'Australcork' in cartons an efficient protection that ensures a perfect product on arrival at the job.

Other Features of "Australcork"

Non-Absorbent.—The inherent natural quality of cork in being entirely free from capillarity is enhanced by the baking process in the production of "Australcork" boards. When the natural gum of the cork liquifies and cements the particles together, it coats the entire surface of each granule with a film of waterproofing gum which is an added protection against the possible entrance of moisture Insulating materials for cold storage temperatures must be naturally free from capillarity; if not, they will, in the presence of moisture, become saturated, and be of no further use as an insulator.

Fire Retardant.—The baking process of "Australcork" binds the granules into a rigid sheet or board, and at the same time forms a carbon that a flame has the greatest difficulty in penetrating. Flames in contact with "Australcork" produce only a surface charring.

Sanitary. "Australcork" contains no binder of a foreign nature and as it is moisture-proof, it will not rot nor give offensive odours. It is vermin-proof.

Practicability. - "Australcork" boards may be cut, sawn and handled as easily as timber of the same size. They may be readily set in Portland cement or bitumen with the same ease as a common building material. There is little or no waste from sawing and fitting, as the left over pieces can be neatly and tightly fitted in. They form a rigid, practical surface with an excellent base for the application of plaster and tiles. No lathing is required.

Providing permanent insulation, structurally suitable, readily available in large stocks at reasonable prices, "Australcork" claims every consideration where permanent efficiency is desired.

"AUSTRALCORK" INSULATION

IN STANDARD BOARDS, 36 x 12 IN.

Thicknesses in inches	1	1½	2	2½	3	4
Weight per sq. ft. in lbs.	¾	1 1/16	1⅛	1⅜	2⅛	2⅜

Thickness of "Australcork" to Use

For temperatures:—

20 degrees to 10 degrees F	12 in.
10 degrees to 5 degrees F	10 in.
5 degrees to 0 degrees F	8 in
0 degrees to 10 degrees F	7 in.
10 degrees to 20 degrees F	6 in.
20 degrees to 30 degrees F	5 in
40 degrees to 50 degrees F	4 in.
50 degrees to 60 degrees F	3 in
60 degrees and above	2 in

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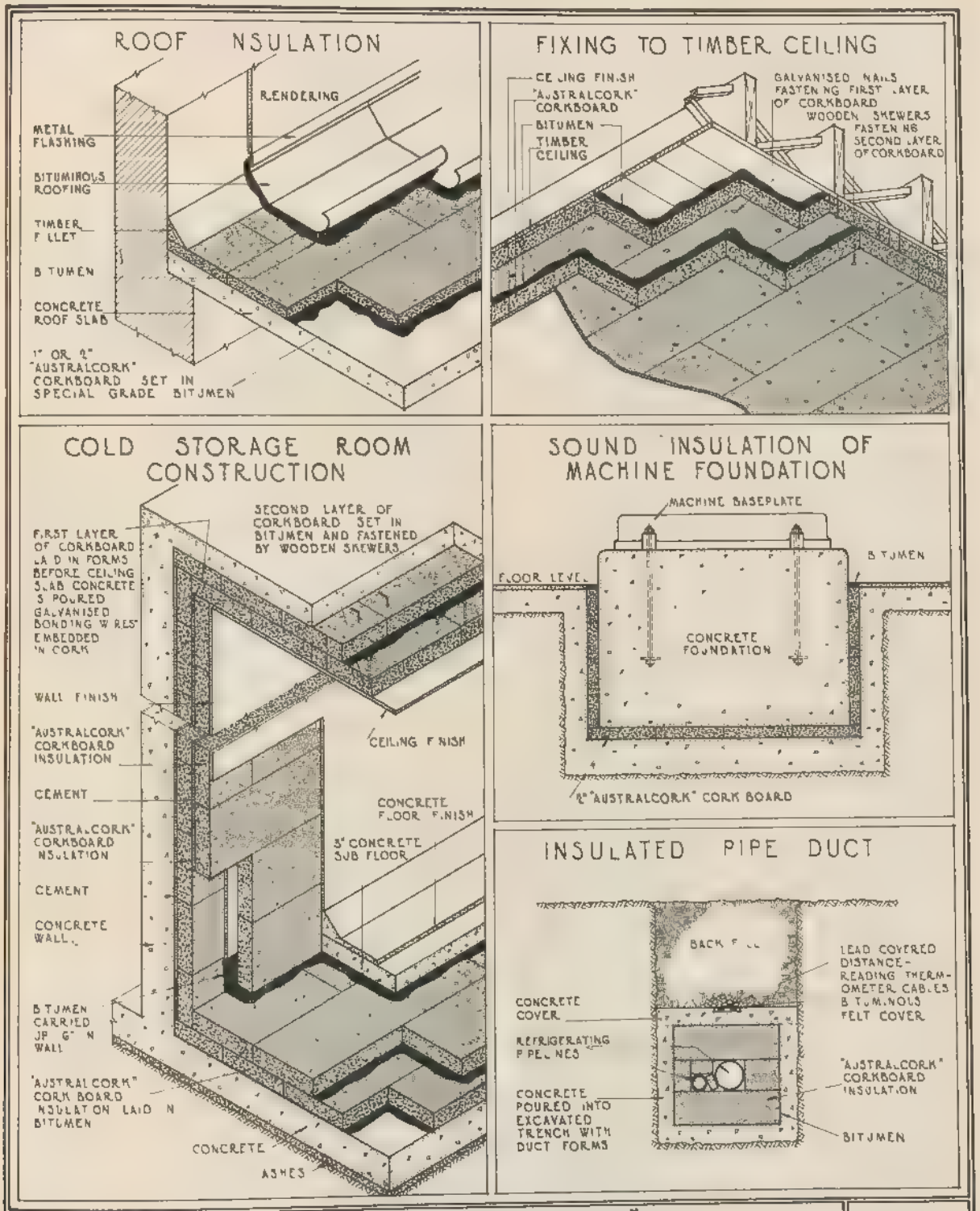

CORK INDUSTRIES (AUST) LTD.

"AUSTRALCORK" CORK INSULATION DETAILS

GIPPS & WAVERLEY STS RICHMOND

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37b

S.A.A. File No.

NEWALL'S INSULATION EXPORT CO. LTD.

Washington Station, Co. Durham, England

INSULATION DISTRIBUTORS.

VICTORIA AND TASMANIA
H. Parks & Co. Pty. Ltd.,
31 Queen Street, Melbourne, Vic.

QUEENSLAND:
Queensland Machinery Co. Ltd.,
142-156 Albert Street, Brisbane, Qld.

NEW SOUTH WALES:
John H. Drummond,
Box 2321, G.P.O., Sydney.

SOUTH AUSTRALIA
Parsons & Robertson Ltd.,
172 Pulteney Street, Adelaide, S.A.

WESTERN AUSTRALIA.
William Adams & Co. Ltd., 432 Murray Street, Perth.

NEWALL'S
85%
MAGNESIA

Products

Insulating products of 85 per cent Magnesia in slab, plastic, block and sectional forms; Asbestos Mattresses, Detachable Flange Covers, Newtempheit High Temperature Insulation, Nonpareil and Newparex Insulating Bricks and Cements; Cork sheets and sectional cork pipe coverings, etc.

Proper Insulation for Heating Systems

The efficiency of any steam or hot water heating arrangement is largely dependant on the economical distribution of the heat transferring medium, and this cannot be effected without suitable heat insulation of the supply mains.

Proper insulation of the supply lines enables hot water or steam to reach the farthest point of the building with a minimum reduction in temperature. Every badly-insulated or bare pipe is a heat-losing pipe, dispersing valuable heat units where they are not wanted from every square inch of surface. These losses can only be eliminated by correct insulation.

Newall's 85% Magnesia "Empire" Sections

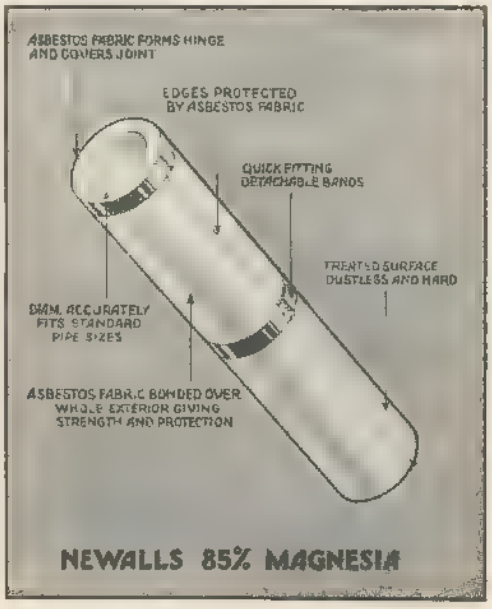
The "Empire" Section is a moulded cylinder of 85 per cent. Magnesia, split longitudinally into halves, and made to fit all pipe sizes. It has an asbestos fabric bonded into the exterior surface of the magnesia, and so arranged that both faces of the joints are covered. The outside is further strengthened and protected by a special compound giving a firm, dustless finish of an attractive buff colour. Each section is provided with two flexible metal fixing bands by which it is clipped to the pipe. The sections are moulded, having an insulating wall thickness of ¾in. or 1in. as is necessary, dependent upon the water or steam temperature.

Heat Conductivity

Newall's 85 per cent. Magnesia has a very low heat conductivity, viz.: K 0.432 B.T.U.'s per sq. ft. per hour per one degree F. temperature difference for one inch thickness at a mean temperature of 200 degrees F.

Method of Fixing

"Empire" Sections can be easily applied by any unskilled man. He simply cuts the binding thread, opens out the Section, places it round the pipe and clips the fixing bands. No protective coat of composition or canvas is required, and the Sections can be removed and replaced without injury.



"Empire" Sections *versus* Composition Lagging

The following paragraphs briefly compare the qualities of "Empire" Sections with composition lagging:—

1. EFFICIENCY.

Composition lagging requires to be applied in a much greater thickness than "Empire" Sections to reduce heat losses to the same amount. Figures, confirmed by the National Physical Laboratory of England, show that heat losses from ¾-in. "Empire" Sections are less than half of those radiated by one inch of composition material. While hair felt is more efficient than composition laggings, it has the serious objection of being a harbinger of dirt, dust and vermin. These defects are overcome by the use of "Empire" Sections. Insulated with "Empire" Sections, any steam plant or heating apparatus will [illegible] less fuel than when composition lagging is used.

2. APPLICATION.

Composition lagging in plastic form requires to be mixed with water to a pasty mass, and necessitates the employment of a skilled workman in order to prevent the daubing of floors and walls with the plaster material, particularly if the heating pipes are close to the wall, as they generally are. Pipes need to be hot to successfully apply plaster insulation, but "Empire" Sections can be applied to the pipes when cold without any mess and dirt or skill required on the part of the workmen.

3. APPEARANCE.

The smaller thickness of "Empire" Sections allow the pipes to be put closer together, and are therefore less obtrusive. The fixing bands have a neat appearance, and the prepared surface takes paint very easily, needing approximately one-third of the usual quantity. When exposed to the weather the Sections should be wrapped with waterproof felt and finished with two coats of bituminous paint, and, if necessary, fitted with galvanised wire netting securely wired on.

Cost

Tests made by the National Physical Laboratory of England show that the insulating value of ¾ in. of Newall's 85 per cent. Magnesia is almost equal to 2 in. of ordinary composition.

Consider the comparative quantities need to insulate a 3-in. bore pipe, 100 ft. long. The relative cross sections are 34.4 sq. ins. of composition and 10 sq. ins. of 85 per cent. Magnesia, making 24 cub. ft. and 6.9 cub. ft., respectively. Average composition weighs 53 lbs. per cub. ft., against 12 lb. for 85 per cent. Magnesia, thus requiring 1,275 lbs. to obtain the same degree of insulation as 82.8 lbs. of Newall's material, or over 15 times as much. Therefore, in purchasing insulating material by weight, the price per ton can be very deceptive, as shown.

ARCHITECT'S SPECIFICATION

No insulating covering shall be applied until pipe work has been tested for tightness and approval. All hot water and steam piping (except horizontal radiator connections, and where otherwise specified) shall be covered with Newall's ¾in. (or 1in.) "Empire" 85 per cent. Magnesia Sections, provided and fixed complete with detachable bands spaced at 18 in. centres.

All bends shall be covered with Newall's specially shaped 85 per cent. Magnesia fittings.

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Newall's Plastic Magnesia Covering

Plastic Magnesia Covering is now supplied in large quantities for covering all kinds of heated surfaces, more especially those which are irregular in shape and cannot be fitted with the moulded forms.

The composition of the material is precisely the same as that of our Sectional and Block Covering, being Carbonate of Magnesia and Asbestos Fibre in the proportions of 85 per cent and 15 per cent.

It is supplied in bags, each containing 56 lbs. of material, and has a covering capacity of 120 sq. feet per cwt. 1-inch thick, with an efficiency equal to 92 per cent.

It is resilient in nature, expanding and contracting with the metal to which it is applied, and is perfectly neutral in action when in contact with metals, wet or dry.

Gauge Pressure of Steam, lbs per sq in.	Temperature of Steam Deg F	Equivalent Thickness of Newall's Magnesia Covering
Below 55	Below 300	1 inch
From 55 to 125	From 300 to 400	1½ inch
From 125 to 230	From 400 to 550	2 inch
—	From 550 to 700	2½ inch

Newall's "Newtempheit" (Reg.) High Temperature Covering

This material, which is the outcome of many years experiment and research, is specially recommended for excessive super-heated steam temperatures ranging from 700 degs. F. to 2,000 degs. F.

The material has all the advantages of our 85 per cent. Magnesia insulation, with none of the disadvantages prevailing among certain other so-called high temperature coverings.

"Newtempheit," which is manufactured by a similar scientific process as is our Magnesia insulation, does not rely on its heat resisting properties, as so many imitations do, by having one main ingredient, e.g., Asbestos. In fact, the proportion of Asbestos contained in "Newtempheit" does not greatly exceed the amount in 85 per cent. Magnesia covering, and is introduced mainly for binding properties.

"Newtempheit" is consequently extremely light and one ton of our speciality has a greater covering capacity than any other high temperature insulation having the same general properties and insulating efficiency.

"Newtempheit," though not quite so efficient as our 85 per cent. Magnesia, does not fall far short in insulating properties, and is probably the most efficient high temperature material available on the market. A thickness of ½-inch is all that is required with a temperature of 700 degs. F to "break down" the initial temperature so that Magnesia covering may be applied for the remainder of the desired thickness.

"Newtempheit" is perfectly neutral in action when in contact with metal surfaces, wet or dry.

"Newtempheit" is available in all the forms in which our 85 per cent. Magnesia specialities are manufactured, e.g., plastic, sections, slabs, sheet metal flange covers, etc., etc.

Directions for Application

MAGNESIA PLASTIC

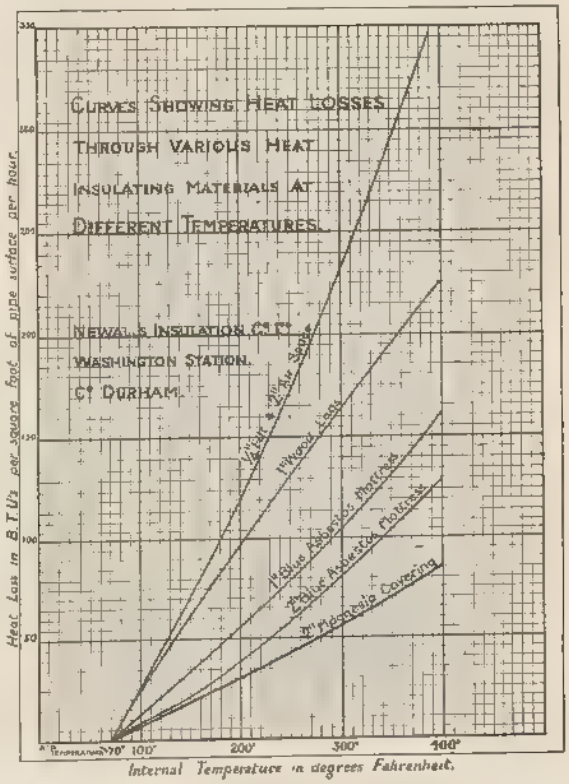
Plastic is sent out in dry form packed in bags of 56 lbs. and should be mixed with clean water to a workable consistence. The surface of metal to be covered should be warm (but not at a high steam heat) and should be free from grease. If the surface is at all inclined to be greasy or any difficulty is experienced in obtaining adhesion, the metal surface should be rubbed over with solution of caustic soda, and when dry a thin wash of Magnesia insulation, which will quickly dry, presenting a rough surface. The desired thickness should be built up in three coats

1. Spot coat applied 'spotting' the material on in small portions.
2. Scratch coat half total thickness left with a rough surface.
3. Final coat left rough, and, where thought necessary especially if there is vibration, a wrapping of wire netting (about 2-inch mesh by 20 gauge) should be used
4. A finishing coat of ½-inch hard setting compound, trowelled to a smooth surface.

If the final coat of Hard Setting Compound is not applied, and wire netting is not used, then the surface of the Magnesia should be trowelled to a smooth finish. The surface may then be canvas wrapped and stitched, or, wrapped with waterproof felt and two coats of bituminous paint, or, otherwise finished

'NEWTEMPHEIT'

'Newtempheit' should be treated in exactly the same way as Magnesia Plastic for the first coat up to ½ inch, then finish off with Magnesia.



[See "Acoustics" Section for information on Newall's Acoustical Products.]

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NONPAREIL AND NEWPAREX INSULATING BRICKS

Furnace Insulation

The need for saving fuel is so vital to production costs that good insulation in any furnace is a necessity. "Nonpariel" and "Newparex" Bricks are used in insulation of Boiler Furnace Walls, Blast Furnaces, Annealing Ovens, Bakery Ovens, Gas Retort, Settings, Metallurgical Furnaces, Waste Heat Boilers, etc.

Crushing Strength

"Nonpareil" Insulating Bricks are of remarkable strength when their cellular construction and lightness is considered. They will withstand a crushing strain of 130 lbs. per square inch (8.35 tons per square foot)

The same result is obtained in whichever direction the test is applied, as the structure is honeycombed and not laminated. This feature enables this form of insulation to be used constructionally when other methods would not be applicable.

"Newparex" is similar to "Nonpariel," but has crushing strain of 25 tons per square foot

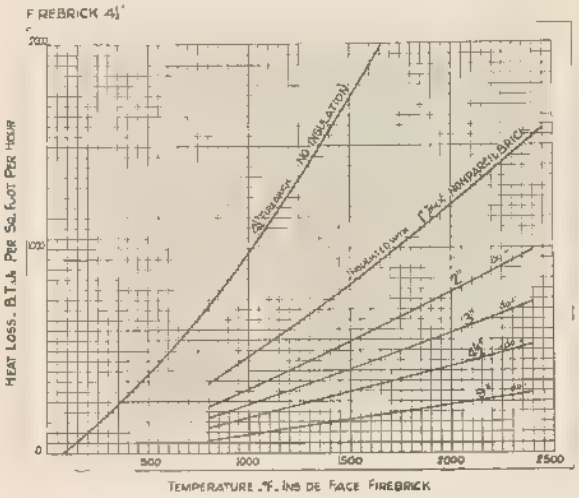
Weight

"Nonpareil" Insulating Bricks are extremely light, which is a point in their favour, especially when plant requiring insulation is being installed on upper floors of buildings. The density of "Nonpareil" Insulating Bricks is only 33 lbs. per cubic foot. Compare this to 100 lbs. per cubic foot for common red brick and 120 lbs. per cubic foot for firebrick. The standard 9in. x 4½in. x 3in. "Nonpareil" Insulating Brick weighs only just on 2.33 lbs.

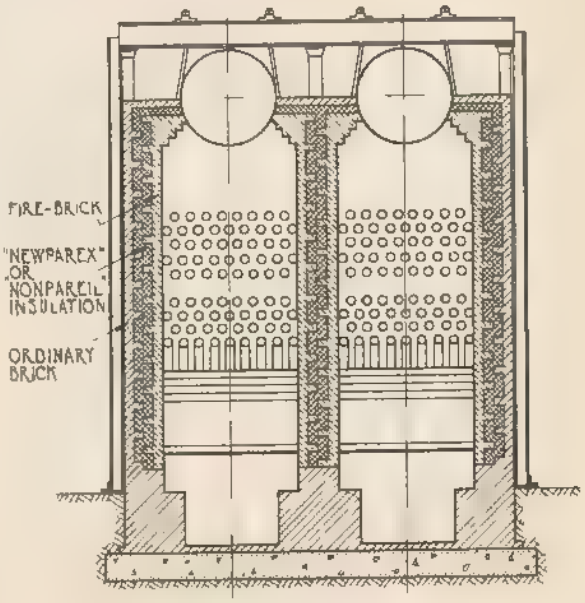
"Newparex" has a density of 41 lbs. per cub. ft.

Working Temperatures

"Nonpareil" Insulating Bricks are intended purely for insulation. They will show no signs of shrinkage,



Curves showing Heat Loss through 4½ inches Firebrick Wall Insulated with various thicknesses of "Nonpareil" Insulating Brick.



Application of "Nonpareil" Insulating Brick to a Large Boiler Installation

cracking or fusion up to a temperature of 1,600 degs. Fah., and may safely be used under such conditions. This figure does not, of course, refer to the temperature inside the furnace or plant to be insulated, but to the temperature at the point in the structure where the "Nonpareil" Insulating Brick is to be applied.

If the insulating bricks are to be used on plant with a higher internal temperature than 1,600 degs. Fah., they should be protected with a sufficient thickness of suitable refractory lining.

"Newparex" will withstand indefinitely a working temperature of 2200 degs. F. and has a thermal conductivity of only about one-fourth that of an average firebrick.

Standard Sizes

Standard sizes are as below, but special sizes can be supplied.

Standard Sizes in Inches

9 x 4½ x 1	12 x 8 x 1	13 x 7 x 1
9 x 4½ x 1½	12 x 8 x 1½	13 x 8 x 2
9 x 4½ x 2	12 x 8 x 2	14 x 7 x 3
9 x 4½ x 2½	12 x 9 x 1½	16 x 9 x 2
9 x 4½ x 3		

Cost

Approximately the same as less efficient bricks, and owing to the great crushing strength they have longer life.

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SECTION W

[Containing S.A.A. Filing Section No. 39]

ACOUSTICS

From the collections of Sydney Living Museums / Historic Houses Trust of NSW

ACOUSTICS

(Prepared by the Technical Staff of Ramsay's Catalogue from authentic sources)

"There are few, if any, buildings which would not be far better for having been treated in part at least with acoustic materials. Such treatment generally proves a sound financial investment."

INTRODUCTION

The noise of present-day machinery, traffic, instruments, mechanical devices, etc., is a strain on the nerves of civilisation. The ill effects of continued noise are noticeable in every direction. The strain of hearing in offices, board rooms, typing rooms, made difficult because of typewriters and office equipment, reduces the efficiency of the workers and wastes the time of executives. In hospitals, noise impedes the recovery of patients by interfering with rest. In hotels and cafes it mars the atmosphere and annoys diners. It hinders education in schools by diverting the attention of the students. Factory workers, especially, suffer from the effects of the continuous roar of machinery. The necessity for control of noise is greater than ever before, and it will increase with time.

Obviously the solution lies in erecting only buildings which are designed and constructed so that sound may be controlled. Research has evolved means by which sound can be controlled, simply and very effectively, and best practice in architecture recognises acoustics as an item in modern buildings as important as, for instance, heating and ventilation. Sound control is becoming a recognised special building trade, and as it is also very much of a science, the design is one which requires the attention of specialists. The services of architectural acoustic consultants are available to the architectural profession so that to-day there is no problem met in sound control that cannot be reasonably solved.

The simplification also of these problems as it effects the practitioner is in no small measure due to the research of those firms who have made available in convenient building units an extensive range of sound-absorbing materials, including plaster, tiles, felts, boards, etc., similar to the materials catalogued in this section.

DEFINITIONS

Acoustics or Sound Control

The word "Acoustics," although used to cover every phase of sound in confined spaces, is incorrect as far as these pages are concerned a better and more comprehensive term is "sound control"

Sound control problems, therefore, fall into three general groups, viz:

1—Acoustical correction.
2—Sound quieting or deadening
3—Sound insulation.

Sound

Sound is a form of energy which, in the form of waves, branches out in all directions at the rate of approximately 1100 feet per second

Pitch

"The pitch of a sound is the frequency of vibration measured as a number of complete vibrations or cycles passing in one second." The full range of frequency extends from 64 to 4096 cycles. The standard frequency is 512 cycles, being the average of speech and music The sound absorbency efficiency of most materials is given in the pitch A figure of 1024 cycles very nearly approximates the average pitch of many mechanical sounds.

Loudness

"The loudness of sound is the strength of the sensation received through the ear"

Sensation Units or Decibles

Sensation units (or decibles, being the scientific unit for noise measurement) are perceptible steps in loudness of sound from the threshold of audibility to the threshold of feeling (i e., can be tolerated without actual physical pain).

(12[illegible]—Threshold of feeling (100, 90)—Noise in aeroplane [illegible] 70)—Noise in underground railway, noise in [illegible] typing office, noise in train (60, 50, 40) Range of speech usually heard in conversation: [illegible] (30, 20, 10, 0)—Average whisper 4 feet away; [illegible] in gentle bre[illegible]

Noise

The introduction of several sounds at brief intervals or at the same time from different sources intensified by the effect of prolonged reverberation results in confusion. This confusion of sound is referred to as noise. As additional sounds are produced, the confusion increases, the sounds overlap and are further intensified, and thus hearing conditions become almost intolerable.

Reverberation Time

Reverberation time is the time taken for a sound to die into inaudibility after the source of the sound has been cut off

Echo

In the case of reverberation, the ear first hears the direct sound, closely followed by succeeding sounds which reach the ear, having been reflected by walls, ceilings and other surfaces, the net result to the ear being a continuous sound If one-fifteenth to one-sixteenth of a second or more of silence elapses between two of these sounds, a distinctive feeling of echo is experienced. An echo cannot be produced in a room under 60 feet in length.

Reflection

Large areas of hard, smooth surface act on sound as a mirror acts on light, reflecting the sound backwards and forwards for a long time, thus setting up excessive reverberation, which is the cause of the majority of acoustical difficulties

It should be noted, however, that reflecting surfaces are essential at times where it may be necessary to group them around the source of sound for amplification, the absorption of the sound being effected on distant walls

Absorption

Every material absorbs sound to a greater or lesser degree, depending on the porosity and other characteristics of the surface. The unit chosen as a standard is 1 sq. ft. of open window, which is regard as being totally absorbent—it is then said to have a co-efficient of absorption of 1.00.

Practically all materials in common use in auditoriums have now been listed, and the sound coefficients are set out in Table 1.

(Continued on next page)

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TABLE I—COEFFICIENTS OF SOUND ABSORPTION.

Materials.	Coefficients per sq. ft.
Open window as basis for comparison	1.00
Brick wall	0.032
Brick wall, painted	0.017
Brick, set in cement	0.025
Carpet, unlined	0.15
Carpet lined	0.20
Carpet, with ½ inch hair felt	0.25
Carpet rugs	0.20
Glass (single thickness)	0.027
Linoleum	0.03
Marble	0.01
Plaster on wood lath	0.034
Plaster on metal lath	0.033
Plaster on tile	0.025
Stage openings, depending on stage furnishings	0.25-0.40
Ventilators	0.75
Wood, plain	0.06
Wood, varnished	0.05
Adult person, each	4.7
Plain wood seats, each	0.15
Church pews, per seat	0.2-0.5
Seats, upholstered seat and back	0.75-2.00
Seat cushions, per seat	1.00-2.00

FORMULA FOR CALCULATING REVERBERATION

The following formula was devised by Dr. Sabine and is in common use:

$$x = \frac{.5\,v}{a} \text{ or conversely } a = \frac{.5\,v}{x}$$

when x = reverberation time in seconds.
v = volume of the entire enclosed space in cubic feet
a = number of absorption units.

Optimum Reverberation Periods

Experiment and general practice have shown that the periods of reverberation for speech and music, which produce the best average conditions, vary with the volume of the room. Thus, in the table below, the optimum or most satisfactory period for hearing conditions is listed, the values given including an average audience, i.e., two-thirds maximum audience. (Note that if the auditorium is to be used for music only, 20 per cent. should be added to the figures. reproduced speech and music (as in sound films) require only six sevenths the reverberation time shown.

TABLE II.—OPTIMUM PERIODS OF REVERBERATION

Below 7,000 cubic feet	1.0 seconds
7,000 to 20,000	1.1 "
20,000 to 45,000	1.2 "
45,000 to 85,000	1.3 "
85,000 to 145,000	1.4 "
145,000 to 225,000	1.5 "
225,000 to 330,000	1.6 "
330,000 to 465,000	1.7 "
465,000 to 630,000	1.8 "
630,000 to 835,000	1.9 "
835,000 to 1,100,000	2.0 "

1. ACOUSTICAL CORRECTIONS

Problems of acoustical correction are those which arise in rooms of the auditorium type, where it is essential that speech or music, or both, shall be heard and understood with comfort and without strain. Included in this type are auditoriums, churches, theatres, music halls, assembly rooms, concert halls, radio broadcasting stations, court rooms, ballrooms, banquet halls, etc.

The acoustics of any enclosed space depends wholly upon three things.

1—Size of room.
2—Shape of room.
3—Material of construction.

a. In Design of New Structures

All three conditions may enter into the study of the design of a new building. There are a few simple rules (given by Paul C. Sabine) which may be followed in design that will assist in providing satisfactory hearing conditions.

1. Side walls and ceilings in the front of the room should reflect the sound at nearly glancing angles to the sides and rear of the room. Thus a fan-shaped plan and a ceiling which slopes upward from the source of the sound is productive of best results.

2. Extended curved wall or ceiling surfaces, particularly those with curvature in two planes, should not have centres or axes of curvatures that fall either on the stage or near any portion of the audience.

3. The average ceiling height should be determined by the number of seats, so that the cubic contents per seat is not greater than about 200.

4. The total sound-absorbing power should be such that, with the average audience present, the reverberation time computed by the reverberation formula will fall within the range of acceptable values for a room having the volume of the proposed room.

5. Upholstered seats should be specified in rooms in which frequent small audience use is to be expected.

b. In Correction after Construction

The first two conditions being fixed, correct results can only be obtained in most cases by the use of suitable corrective materials. Questions of echo should in all cases be dealt with by an acoustical expert as very careful experiment and calculation are usually necessary to effect a cure.

2. SOUND QUIETING OR DEADENING

It is estimated that ninety per cent. of all problems concerned with indoor noise are problems of reverberation. The reason is the very low sound-absorbing properties of the common interior finishes such as plaster, metal and wood, materials which reflect by far the greatest portion of the sounds reaching them. The remedy lies in the proper application of porous materials which will partially absorb sound before it becomes objectionable or disagreeable to the ear. Experience and theory show that the amount of noise, if reduced and prevented from spreading, is dependent on the amount of absorption added in the room.

Since there are no mathematical calculations to be used in determining the amount and type of absorbing material, the experience offered by manufacturers of sound-absorbing material should be accepted in this regard.

3. SOUND INSULATION

Problems of sound isolation are concerned with the transmission of sound through walls, floors, ceilings and other partitions. This type of problem also includes the isolation of sounds and vibrations caused by the operation of mechanical equipment in buildings of various types. The problems in this group differ from those of sound quieting or acoustical correction and require different methods of treatment. Ordinary building materials such as stone or brick are very high transmitters of sound, and it becomes necessary to insulate these substances in order to cut down the transmission. Partitions and floors in which direct contact from one side of the structure to the other may be broken by means of staggered studs and ceiling joists, which aids very considerably in deadening sound. The hardest noises to control are those known as "tapping noises," that is, those noises generated directly on a surface, such as footsteps on a floor. The air-borne sounds, such as speech, are far more easily governed. It should be noted that approximately seventy per cent. more sound is transmitted through contact points than through other parts of the structure.

The efficiency of any building material, whether individually or framed up in combination with others and used on a partition or floor, is measured in the reduction or loudness through the material measured in sensation units (see under "Definition"). Much sound may be reduced at its source; whatever mechanical units produce noise—lift machinery, fans, refrigerating machinery, heating units should be selected for quietness as well as for efficiency of operation. Suitably insulated bases and anti-vibration mediums for eliminating vibration are available; these materials should be resilient, free from any permanent deflection and be unaffected by temperature changes. A judicious location of pipes and conduit to avoid possibility of easy transfer of sound well repays the additional time in design.

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S.A.A. File No.

ACOUSTICS (AUST.) PTY. LTD.

ACOUSTICAL CONTRACTORS

4th Floor 20 QUEEN STREET, MELBOURNE

Telephone: C. 8631

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S.A.A. File No.

A Contracting Company

Each year more importance is being given to the science of Acoustics by Architects, not only in designing of new buildings, but in the reconditioning of old for correct sound purposes. Until recently difficulty has been experienced by Architects in getting their specifications correctly and pleasingly carried out by Contractors in this class of work. Recognising that there was scope for a company specialising in the correct application and decoration of acoustic materials, Acoustics (Aust.) Pty. Ltd. has been formed with a view to carrying out this class of work in its entirety.

Material and Workmanship

Acoustics (Aust.) Pty. Ltd. has accomplished work ranging in magnitude from rooms such as 3AW Broadcasting Studio to the correction of large Auditoria as instanced in Hoyts' North Brighton Theatre. This firm is not committed to the use of any particular materials, but uses for its corrections the materials specified by the architect for each particular job. Acoustics (Aust.) Pty. Ltd. has a staff of men thoroughly acquainted with the best methods of erecting and decorating acoustic felts, acoustic plaster, acoustic tiles of all descriptions, and has used all the boards having a high sound absorption co-efficient.

The illustration shows sound correction methods applied to the ceiling of the Main Chamber of the A.M.P. Building. The architects, Messrs. Bates, Smart & McCutcheon, with whom were associated Messrs. H. V. Taylor & Soilleux, architects and acoustical consultants, specified a double thickness of ¾ inch acoustic felt, to be applied to the recessed portions of the ceiling. Thus 1½ inch thickness of felt was attached to the ceiling with a special mastic and the felt covered with forfar flax canvas. The canvas was then treated to resemble stipple plaster and finished with a plaster bolection mould. One of the features of this job was that it was carried out without any interference to the daily routine of the A.M.P. Society. A hanging scaffold protected [illegible] work [illegible] A.M.P. Society's employees. On the completion of the work it was found by measured tests that the noise level of the chamber has been reduced by seven decibels.

Choice of Decoration

Another problem that has given trouble in the past is that of correct decoration of acoustic materials, in order not to impair their sound absorption co-efficient. Acoustics (Aust.) Pty. Ltd. has made a careful study of this question and is in a position to advise architects and carry out the necessary decoration in the most suitable media for the various materials. The danger of applying water paint, for example, to some materials cannot be too carefully stressed.

Decoration

Another point to be emphasised is the ease with which a redecoration scheme of an existing theatre, church, boardroom, office, classroom or the like may be carried out in acoustical materials, thus combining correct sound control with pleasing decorative effects. Any system of sound control carried out by Acoustics (Aust.) Pty. Ltd. can be successfully applied to the interior of existing buildings with little or no mutilation of their architectural lines and with no visible alteration in shape and size.

Acoustical treatment is never objectionable in itself, for once applied it is susceptible of being finished in any way desired. Any style of interior finish—stone, tile, smooth or sand finished plaster—trulays, brocades, paints or murals—can be reproduced at will. Acoustics (Aust.) Pty. Ltd. has brought the decoration of felt, for example, to such a point where it is impossible at the distance of a few feet to distinguish it from plaster. One of the most satisfactory methods of decorating tiles and boards is with a special acoustic lacquer, on which extensive experiments have been conducted with a view to ascertaining its effects throughout the full range of frequencies. The subject of dyes and stencils has been carefully investigated and the most satisfactory results ascertained by experiments and test.

No Inconvenience

Another point to be stressed is that Acoustics (Aust.) Pty. Ltd. works in to the fullest extent with the everyday routine of the organisation for which corrections may be made. When correcting picture theatres, it has been found imperative that there should be no cessation in the presentation of programmes, and the entire correction has been effected without interfering with the performances.

Sound Insulation

Another sphere of activity in which Acoustics (Aust.) Pty. Ltd. is vitally interested is that of sound insulation of buildings whether against external noise or to prevent the transmission of noise. The Company is prepared to erect sound proof partitions, or in fact treat any problem of this nature that may arise; and is thoroughly acquainted with all the recognised methods of sound-deadening.

Service to Architects

Acoustics (Aust.) Pty. Ltd. endeavours to give service to architects in all matters relating to sound control, and has in its office samples and displays showing the various recognised methods of acoustical correction. This display room is at all times at the service of Architects, who may wish to show clients the finished appearance of any of the usual methods of correction. Enquiries may be confidently pursued as to the costs of various types of erection fixed complete, whether to walls or ceilings.

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"SORB-SOUN"

"SORB-SOUN"

(PATENT APPLICATION No. 5289/31)

For Acoustical Correction and Sound Reduction — The Acoustical Material with Architectural Character.

VICTORIA
James Bell Mineral Products Pty. Ltd., 31 Queen St., Melbourne, C.1

NEW SOUTH WALES.
Bradshaw & Co., "Sirius House," 23 Macquarie Place, Sydney.

SOUTH AUSTRALIA
James Bell & Co. Pty. Ltd., Bright St., Croydon.

WESTERN AUSTRALIA
Ajax Plaster Co. Ltd., 520 Murray St., Perth.

QUEENSLAND
Barker & Co. Ltd., 87-89 Eagle St., Brisbane.

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S.A.A. File No.

What "Sorb-Soun" Is

Sorb-Soun is an artificial stone with a fine granular surface having a sound absorbing value many times that of ordinary building materials. Owing to its light weight and facility of manufacture, "Sorb-Soun" is easily adapted to plain or elaborate architectural forms.

It is supplied in tile form or applied as a plaster by the above firms.

Where "Sorb-Soun" is used

For Acoustical Correction in: Theatres, Churches, Masonic Temples, Lecture Halls, Schools, Broadcasting Studios, Council Chambers and Board rooms. For Noise Reduction in:—Banking and Insurance Chambers, Offices, Cafes, Hospitals (Corridors, Kitchens, Operating Theatres, etc.), Hotels (Corridors, Kitchens, Bathrooms, Diningrooms, etc.) and Factories.

"Sorb-Soun" Tile

Absorption. — The standard Tile has the unique feature of being an ideal absorbent. It takes up just the right amount of each note. Frequently absorbent materials that do not follow this ideal will give distortion, absorbing portion of the notes and leaving others. The absorption of low notes may be increased by the use of a patent system of special washers applied to the tiles.

Permanency. "Sorb-Soun" is everlasting. It is verminproof, fireproof, and may be washed or sprayed. It will not buckle and get dirty like most other absorbent materials.

Appearance.—The appearance of "Sorb-Soun" is artistic. Tiles are self-coloured and can be lightly sprayed and stenciled without materially affecting the absorption.

Size Standard Tiles—
18in. x 18in. x 1in.
24in. x 24in. x 1in.
24in. x 12in. x 1in.

Others can be made if required. Tiles may be sawn [illegible]

Weight
Approx. 3½ lbs. per sq. ft.

A CLOSE-UP VIEW SHOWING THE TEXTURE OF SORB SOUN'

Sound Absorption Values

Expressed in coefficients of absorption from tests conducted by H. V. Taylor & Soilleux, A.A.R.A.I.A.

Frequency in vibrations per second	64	128	256	512	1024	2048	4096
Absorption Coefficient of "Sorb-Soun" Tile	.39	[illegible]	[illegible]	[illegible]	[illegible]	.68	.46
Absorption Coefficient of "Sorb-Soun" Plaster	.29	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

The absorption of low notes may be increased by the use of a patent system of special washers applied to the tiles.

"Sorb-Soun" Plaster

Description. — Tests have shown that mere surface texture does not make an efficient acoustic plaster. The granular appearance and internal porosity is the same throughout the entire thickness of "Sorb-Soun" plaster and is thus responsible for its high efficiency in absorbing sound.

Application. "Sorb-Soun" used as a plaster is applied [illegible] inch thick on ordinary lime and cement rendering, as below.

Permanency.—The plaster is also quite permanent. It is fireproof, verminproof and is not affected by water or water-vapours.

Specification Notes

Designing Details. — When designing approximately 1½ inch should be allowed for plastering (½ inch rendering, ½ inch bonding coat applied, and ½-inch "Sorb-Soun" plaster).

SPECIFICATION CLAUSE.—"Allow the sum of £ ..... to be paid to .. for the applying of 'Sorb-Soun' plaster on areas as shown on plan, etc." "Builder shall render all walls with a mortar ½ inch thick, coat consisting of 1 part hydrated lime, 1 part Portland cement, and 6 parts clean, sharp sand. He shall also supply all scaffolding in position necessary for carrying out subsequent plastering of 'Sorb-Soun,' and shall provide all haulage of materials on the job."

Economy
"Sorb-Soun" will prove economical to use when its decorative value is taken into consideration, and further, it will not need decorating at a later date.

Erection
Tiles are erected in required position on either wall or ceiling by manufacturers. They are screwed to battens, screw holes being stopped up and joints tuckpointed.

Layout
Tiles may be set out in any fashion such as square, diamond or herringbone patterns. Ashlar pattern gives an excellent stone effect for wall work.

Specification Notes

Designing Details.—The tiles are fixed direct to 1 inch thick battens at 12in., 18in., or 24in. centres in one direction only. When the type of construction requires that bolts should be used to fix battens on grounds, then it is necessary to cross batten in order to provide clearance for bolt heads—in this case a further 1-inch thickness should be allowed, making a total overall thickness, including tile, of 3 inches.

SPECIFICATION CLAUSE. "Allow the sum of £ ..... for the erection of 'Sorb-Soun' to be paid to ..... 'The Builder shall place Tiles on areas shown on plan, etc.' bolts in concrete (or state other construction) for fixing seasoned oregon battens to take 'Sorb-Soun' Tiles in position shown on plan, and shall supply all scaffolding in position necessary for erection of these tiles. He shall also provide all haulage of materials on the job."

Service

The nature of "Sorb-Soun" and the success of its performance as a sound absorbing material demands that the work be carried out by skilled workmen. The suppliers of "Sorb-Soun" each have a special staff of fixers and plasterers specially trained for this work. We are pleased to submit schemes and quotations for any acoustical correction, sound reduction or insulation problems.

Some Representative Installations

The following list shows some of the jobs in which "Sorb-Soun" has been used or is specified. Shell Co. of Aust. Ltd., [illegible] Architects E. H. McMichael & Harris. Shell Co. of Aust. Ltd., Western Australia Architects Hobbs, Smith & Forbes. State Electricity Commission Building, [illegible] Architects [illegible] Plaza Theatre, [illegible] H. V. Taylor & Soilleux. [illegible] Architects H. V. Taylor & Soilleux. [illegible] Architects Stephenson & Meldrum. [illegible] Victoria—Architects, Stephenson & Me[illegible] Wallsend Theatre [illegible] (Aust.) Ltd. [illegible] son.

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FELT & TEXTILES OF AUSTRALIA LTD.

ENDEAVOUR HOUSE, 33 MACQUARIE PLACE, SYDNEY
'Phone: B.3335

FEDERAL FELTERS PTY. LTD.

396 FLINDERS LANE MELBOURNE, C.1
'Phone: Central 1336

MANUFACTURERS OF ALL TYPES OF FELTS

Factories at Botany Road, Waterloo; O'Riordan & Doody Streets, Mascot; and Dynon Road, Footscray.

"EXELTONE"

"FELTEX"

EXELTONE
SOUND ABSORBING MEDIUM

Sound is absorbed through qualities of porosity and flexibility. With this ultimate idea in view, "Exeltone" has been evolved as the most perfect sound-absorbing medium. Carefully prepared to a rigid standard specification, as the result of our investigations and research, this material has been calculated to give the maximum absorption for all general purposes.

"Exeltone" is composed of carefully-mixed and graded animal hair, all deleterious material having been eliminated in the course of manufacture. These constituent fibres are processed into a felt-like material, which is made in rolls or sheets, according to the particular requirements.

The proper density of the material has been arrived at by a series of experiments, resulting in a product in which there are definite percentages of solids and voids, in order to acquire the maximum sound-absorbing qualities. The raw materials are by their very nature extremely fire-retardant, and the fabric, when manufactured, possesses high thermal insulating qualities. Moreover, thorough treatment of the basic materials prevents the undesirable possibility of the harbouring of vermin.

The extreme lasting qualities of hair are definitely established, and added to this a high content of calcium carbonate gives it resistance to moisture.

Application of "Exeltone"

"Exeltone" can be applied to walls and ceilings in as simple a manner as any form of architectural finish or decoration. By a variety of surface treatments, it can be made to resemble plaster, it can be rendered washable or capable of treatment in a variety of tints and colours, or finished with special lacquers or fabrics, such as linen, casement cloth, sateen, burlap, tapestry, or brocade. There are endless decorative possibilities, depending on the ingenuity of the designer. There need be no hesitation that the adoption of this sound-absorbing medium will impose any restriction on the free expression of interior decorative taste.

"Exeltone" is made up in rolls 70 in. and 35 in. wide in 6 yd. lengths, and also in sheets 70 in. x 4 ft. or anything under 4 ft. To apply to walls, ceilings or other surfaces, whether of brick, concrete, plaster, iron, or wood, a special mastic cement is supplied, adapted for extreme climatic conditions. The cement should be applied to the wall with a trowel or a short thick bristle brush. The felt is then applied and pressed to the cement surface, after being cut to the required size.

For the purpose of cutting and trimming "Exeltone," shears are recommended, and when the material is applied care should be taken to neatly join the edges, by cutting slightly over-size and compressing and cementing together. Care must be taken to render the joints inconspicious before the application of the surface treatment.

The face of the "Exeltone" may be lacquer sprayed or covered with a membrane such as tapestry, brocade batiste, perforated American cloth, or any fabric possessing qualities of sound transmission. This membrane is attached to the "Exeltone" face with a special flexible waterproof adhesive, maintaining the flexibility and porosity of the material. The membrane is then applied and adhered to the "Exeltone" and carefully smoothed to eliminate creases.

The matter of the adhesive is an important one, and the acoustic merit of the material may be seriously impaired by the use of an unsuitable substitute. For cementing the material to the wall surface, our special "Exeltone" Mastic Cement should be used, and for applying fabric membranes "Exeltone" Flexible Membrane Adhesive should be obtained. These adhesive products have been evolved specifically for this purpose and can be supplied in suitable quantities, in accordance with the areas to be treated with "Exeltone."

The manufacturers are prepared to supply "Exeltone" in sheets of sizes already specified, already covered with burlap, either plain or dyed to any desired shade. The treatment, if applied to walls in this form, will require no further finish. In order to obtain extra thicknesses of felt, that is, sizes over ¾ in. thickness, to suit special acoustical requirements, the "Exeltone" may be glued together in layers by using "Exeltone" adhesive.

Sound Absorption Co-efficients

The following table gives the percentages of incident sound energy absorbed throughout the varying frequencies and is the average of five separate tests on different pieces of material of unfaced "Exeltone" —

Frequency in Cycles per Second	Per centage of Incident Sound Absorbed	Frequency in Cycles per Second.	Per centage of Incident Sound Absorbed
68	19.0%	700	63.9%
80	20.7%	800	66.5%
100	25.1%	900	68.4%
128	26.6%	1000	70.0%
170	30.9%	1200	72.3%
200	33.0%	1400	72.8%
250	37.4%	1600	72.5%
300	41.3%	1800	71.6%
350	46.0%	2000	70.0%
400	49.0%	2200	68.0%
450	53.2%	2400	65.0%
500	56.0%	2600	62.0%
600	60.0%		

Authorities:—H. Vivian, Taylor & Soilleux, Architectural Acoustic Consultants.

The tests were conducted by the Reverberation Chamber Method.

Further information regarding Sound Absorbing Coefficients and Acoustic particulars of various forms of treatment furnished on request.

(Continued on next page)

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"FELTEX" ANTI-VIBRATION FELT

Description

"Feltex" Anti-Vibration Felt is not an ordinary felt, nor should it be confused with "Exeltone" Acoustic Felt. It is a special insulating material composed of selected animal hairs hydraulically pressed and impregnated, and having a compacted and hardened surface layer. The material is capable of withstanding very high compression or heavy loads without becoming permanently compressed. Tests indicate that the material possesses permanent resilience.

Insulation Against Impact Sounds

Just as "Exeltone" Acoustic Felt absorbs air-borne noise, "Feltex" Anti-Vibration Felt absorbs structure-borne or impact noise—each material has its definite uses. Ordinary felts become permanently compressed when subjected to loading or shock, and lose their sound-insulating qualities. By special process of manufacture, the elasticity of "Feltex" Anti-Vibration Felt is made constant and it will never take a permanent set.

Protection Against Damp, etc

The material is naturally damp resistant, and the hardened surface affords a measure of protection against penetration of oil or other deleterious agencies. When exposed to excessive damp or oil, special paints are supplied which should be applied over the faces and edges of the "Feltex" Anti-Vibration Felt. The use of the paint is also recommended when the felt is to be set under concrete or in masonry or brickwork.

Sizes and Types

"Feltex" Anti-Vibration Felt is supplied in standard thicknesses of ½ inch, ¾ inch, and 1 inch, but special thicknesses can be manufactured to specification. There are two types, the "plain" and the "layer-built."

Plain "Feltex" Anti-Vibration Felt may be obtained in all thicknesses, whilst the layer-built is manufactured in ¾ inch and 1 inch thicknesses as standard.

The layer-built material has specially compressed cork 1/16 in. thick between the various layers of felt, and possess greater qualities of sound absorption, as the passage of noise and vibration is impeded more readily by alternate layers of materials of varying density. "Feltex" Anti-Vibration Felts are made up in sheets of all sizes up to 4 ft. 0 in. x 2 ft. 0 in. and special sizes, thicknesses, and pieces may be cut to template.

Uses and Application

It is impossible to list the full uses of "Feltex" Anti-Vibration Felt, but its chief use is to form a resilient cushion which, when placed under the foundations or beds of machinery, or used under the bearings of columns or steel girders, or built into foundations or walls, damps out vibration and prevents sound transmission. It can be used with advantage for insulating pads to be packed between the rails and the chairs or sleepers of the permanent way of railway lines, and for tramways.

Elevator machinery and girders and equipment supporting same should be insulated from the structure by anti-vibration felt. Motors, transformers, convertors, and all machinery in buildings, printing machines, etc., should be similarly insulated.

In theatres and all public buildings, all mechanical equipment, ventilating machinery, fans, etc., should be bedded and secured with "Feltex" Anti-Vibration Felt to eliminate noise transmission. The material may be used between the chassis and body of motor cars, between the under-frame and car bodies of tram cars, and used under the bed plates of high speed machines.

Buildings, particularly those of homogeneous construction transmit impact sounds through their structural framework with great rapidity and intensity. It is therefore essential that all forms of noise and vibration be damped at their source by proper structural disconnection and insulation. Underground railway noises, street traffic vibrations, etc., can be eliminated by the proper use of "Feltex" Anti-Vibration Felt.

Advantages

The economical advantages of this insulating material can scarcely be over-stated. Buildings have been rendered untenantable by noise and vibration of machinery, whereas, if machines are placed on anti-vibration felt, proper rental returns can be obtained from the premises let in various occupancies, and rooms and floors immediately adjoining the machines are not adversely affected.

The resilient base to the mechanical equipment spares the building from excessive depreciation due to the shocks of impact, and reduces maintenance and repairs.

Printing presses installed in buildings frequently cause excessive deterioration to the structure, and the vibration and noise therefrom has made it impossible to have offices in proximity thereto.

The machines can be kept perfectly steady and the full use can be made of the premises by installing proper insulating mats of anti-vibration felt.

Furthermore, it can be claimed that the life of the machinery is increased as the resilient base gives equalised position to the reciprocating parts. If rotatory machinery is firmly bolted to an unyielding foundation the moving element or rotor is frequently forced to rotate out of its true axis and friction and vibration is set up. On the other hand, if "Feltex" Anti-Vibration Felt is used, the bearings of the machine yield to the movement of the rotating portions and take up a true alignment, eliminating vibration and consequent unnecessary wear and tear.

Compression Test

The following figures from the P. N. Russell Engineering Laboratory of the University of Sydney indicates the compressive resistance and resilience of Anti Vibration Felt:—

SPECIMEN "F," "FELTEX" ANTI-VIBRATION FELT

1.84 lbs. per sq. ft., Area 36 sq. ins. Mean Thickness [illegible]

Stress in lbs. per sq. foot	Compression in ins.	Permanent Set in Inches	
[illegible]	0.164		
[illegible]	0.14[illegible]	Load released	0.150
[illegible]	[illegible]		
[illegible]	[illegible]		
[illegible]	[illegible]	Removed from machine	0.11
[illegible]	0.233		
[illegible]	0.233		
[illegible]	0.242	24 hours after release of load	0.05
[illegible]	0.251		
[illegible]	0.258		
220,000	0.262	Remarks.—After test specimen dished convex on hard side.	
240,000	0.268		
260,000	0.272		
280,000	0.276	Signed— William A. Miller, Professor of Civil Engineering.	
300,000	0.279		

Typical Methods of Fixing

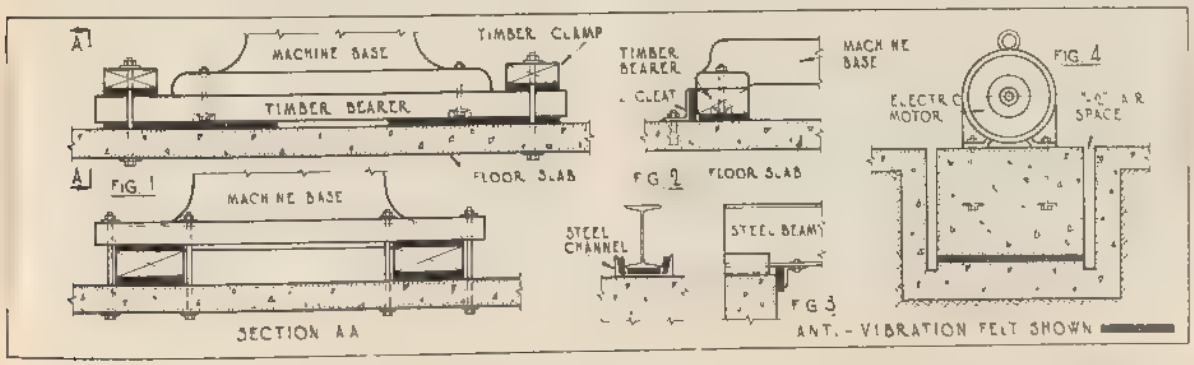
If specific requirements are stated, we are in a position to make calculations as to the exact area of felt that is required to give a unit of pressure that will insure maximum insulation, also correct methods of application.

Generally, it is important that there should be complete disconnection, and holding down bolts which are anchored in the foundations or structure should not be directly connected with the base plate of the machines, otherwise sound is transmitted through this channel. (See details below).

Printing machines and other heavy weight equipment oft-times need not be bolted to the floors or foundations. These may be set on wood planks about 2 inches or 3 inches thick, with anti vibration felt between the planks and the floor.

If fixing is required, this can be done by a double framework as illustrated (see Fig. 1), the section that is bolted down being separated from the other by a layer of felt. Alternatively blocks or cleats can be bolted to the floor to prevent lateral movement (see Fig. 2), and these are separated again by felt.

Washers and bushes of anti-vibration felt can be supplied to be used with bolts, to ensure perfect disconnection with structural steel and metal connections.



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S.A.A. File No. 39

AUSTRALIAN ADDRESS
G.P.O. Box 3248P,
Sydney, N.S.W.

ACOUSTI-CELOTEX

Manufactured by
THE CELOTEX COMPANY
919 North Michigan Avenue,
Chicago, Ill., U.S.A.

MILLS
New Orleans, La., U.S.A.

ACOUSTI-CELOTEX

F1. ACOUSTI-CELOTEX WORKING DRAWINGS: Ceiling and/or wall area should be carefully laid out in working drawings, showing surface to be covered and tile pattern or design, bases for nailing and/or cementing, together with all other details. Leave nothing to the option of the workman. When the job is ready for fixing, it is also advisable to lay out the work on wall and/or ceiling in crayon; show accurately the surfaces to be treated, mark centre lines both ways for each space or panel, and starting position of first tile (viz., straddling one or both centre lines alongside of one or both centre lines). Give instructions to begin fixing from centre, continuing out to edges. Laying out the job properly and maintaining true lines during application are absolutely essential to the good appearance of the finished installation.

F2. ACOUSTI-CELOTEX—NAILING BASE: All nailing surfaces or bases (wood linings, nailing strips, masonry construction or plaster) must be level. Acousti-Celotex in tile form accentuates any irregularities of the base over which it is fixed. It is important that the preparation of a level nailing base be given due care. Nailing bases for curved surfaces must be symmetrically level.

F3. ACOUSTI-CELOTEX — PATTERNS — PANELS — BORDERS: Over large level areas, where the entire surface is to be covered, any one or all three sizes of Acousti.-Celotex may be used and fixed in any one or any combination of patterns such as square, diamond, basket-weave, herring-bone, or broken joint, with or without a border at edges or around columns.

F4. ACOUSTI-CELOTEX—CURVED SURFACES: For coves or curved surfaces with a radius of less than 8 ft., it is advisable to kerf each tile across its back with one or more saw cuts, about 3/16th in. deep, so that each Acousti tile may accommodate itself to the required curvature. In the layout of double curvature surfaces, divide them into equal sections, by radial ribs of Acousti-Celotex; a crayon line down the centre of each sector marking the start for fixing, working out to the radial ribs. A herring-bone pattern is recommended for the field, using 12 in. x 6 in. tile for both radial ribs and field. This procedure also applies to domes and double-curved groined ceilings.

F5. ACOUSTI-CELOTEX—NAILING: Nails used should be galvanized, "cement coated" (dipped in rosin), copper or lead coated. Nail heads should never be larger than 3/16th in. so as to fit easily into corner holes without tearing or marring the surface while driving and punching in.

Over wood nailing strips use a 1¾ in. or 2 in. nail for Type BB Acousti-Celotex; a 1½ in. nail for Type B; and a 1 in. nail for Type C. Two holes at each corner of Types B and BB are drilled shallow to provide a firm nail hold; also there are two shallow holes midway between corners on 24 in. edge of 24 in. x 12 in. tile. For fixing Types BB and B Acousti-Celotex to nailing strips or wood nailing base, toe-nail each exposed edge, starting nail below the beveled edge so as to set the edges snugly against tile already fixed. At all shallow corner holes use one nail (two if necessary). Toe-nail each exposed 24 in. edge of 24 in. x 12 in. tile, with two or more nails; also use one nail (two if necessary) in the shallow holes midway between corners on both 24 in. edges. Use a nail punch with flat head and straight shank not more than 3/16th in. in diameter to seat nails firmly in holes. Do not use a tapered nail set which might easily marr or enlarge holes, causing an unsightly appearance.

F6. ACOUSTI-CELOTEX — TIMBER CONSTRUCTION — UNPLASTERED: Nail Acousti tile directly to the existing lining when possible. Give attention to discoloration due to air currents. In the absence of a firm level nailing base, fix 3 in. x 1 in. nailing strips, spaced to fit size of Acousti tile selected, over studs, joists, rafters, or other supporting framework, provided these supports are spaced on not more than 30 in. centres; for greater distances provide level framing of proper size and strength, on not more than 30 in. centres, that will amply support both 3 in. x 1 in. nailing strips and Acousti tile. Select for nailing strips well-seasoned fir, cypress or other suitable timber not given to warping or twisting and that nailing will not split. Fix nailing strips on 6 in. or 12 in. centres, spaced to fit size of Acousti-Celotex tile selected, arranged for the required design or pattern and to provide a firm nailing base. Nail tile as directed.

F7. ACOUSTI-CELOTEX — MASONRY CONSTRUCTION — UNPLASTERED: (CEILINGS — concrete — beamed concrete — tile and concrete. WALLS — concrete—brick—stone—gypsum or clay tile.) The application of Acousti-Celotex directly to these surfaces cannot be recommended because a suitable cementing mixture has not been found that under all conditions can be used without nailing; it is usually difficult or impossible to nail into masonry construction so as to hold Acousti-Celotex while the cementing mixture sets. Wood sleepers fixed to masonry surfaces with 3 in. x 1 in. nailing strips across them is usually the easiest method of providing a nailing base.

In new concrete construction, 3 in. x 1 in. chamfered sleepers on not more than 30 in. centres may be placed in forms before pouring concrete; or metal clips, not more than 36 in. apart, lined and spaced on 30 in. centres, may be used for fastening 3 in. x 1 in. sleepers. In existing concrete construction, 3 in. x 1 in. sleepers may be fastened on not more than 30 in. centres with expansion bolts, drive-ins, rawlplugs, or drilling and plugging, fastening not more than 30 in. apart; across sleepers or firring, 3 in. x 1 in. nailing strips are securely fixed. Over brick and stone construction it is sometimes possible to nail 3 in. x 1 in. nailing strips to mortar joints, but wood plugging, expansion bolts, drive-ins, or rawlplugs can always be used for fixing, when necessary.

Space nailing strips on 6 in. or 12 in. centres to accommodate the pattern of Acousti tile selected. Over gypsum tile that is level and fairly smooth, Acousti tile may be directly nailed. Nail Acousti tile as directed in F5. See F10 for discoloration.

F8. ACOUSTI-CELOTEX — PLASTERED SURFACES — MASONRY OR TIMBER CONSTRUCTION: When the plaster is strong enough to provide a grip for the nail and to withstand the shock of nailing, Acousti tiles are fixed by using an approved waterproof cement, buttering back of tile with a dab of cement near each corner, working cement well into tile with buttering knife, press tile into place against plaster and hold in place by nailing as directed in F5. Nailing is necessary to hold Acousti tile in place until the cement sets and as an added factor of safety in case the cement bond with the plaster fails for any reason. Before fixing inspect plastered surfaces for loose or blistered oil paint or kalsomine (distemper), scrape loose or blistered paint surfaces and thoroughly wash off kalsomine, otherwise the bond between the cement and plaster will only be as strong as the paint or kalsomine. For plastered concrete, brick, stone, metal lath, clay or gypsum tile ceilings or walls, experience indicates that only hardwall (gypsum) and Portland cement plastered ceiling surfaces provide a satisfactory nailing base; for walls, any plaster that is strong and FIRMLY BONDED will be found acceptable for cementing and nailing; this is also true for ceilings when plastered over wood lath.

Over wood linings, or over wood lath and plaster, fix Acousti-Celotex by nailing directly to the lining or through to the wood lath. The plaster, however, should in all cases be carefully inspected and tested by driving nails at several places before starting work. When there is evidence of a roof leak (old or new) inspect carefully, making sure plaster has not been weakened or loosened. When the plaster is very weak or in extremely bad condition, it may be necessary to remove it entirely before fixing firring or nailing strips. In either masonry or timber construction, plaster that is less than ¼ in. thick, loose, weak, not firmly bonded, or that may be loosed by nailing, should have 3 in. x 1 in. nailing strips fixed over the plaster as directed in F6 and F7.

F9. ACOUSTI-CELOTEX SHEET METAL SURFACES (1) When timber framing, over which sheet metal is fixed, is properly spaced, fix Acousti tile directly over metal, nailing through to framing; or (2) fix 3 in. x 1 in. nailing strips over the sheet metal where existing framing is not properly spaced; or (3) remove sheet metal and fix nailing base spaced to fit Acousti-Celotex tile.

F10. ACOUSTI-CELOTEX AIR CURRENT DISCOLORATION: When tiles are not fixed directly over backing, such as plaster or wood lining, careful consideration should be given to air infiltration (due to temperature changes) between tile and also through the holes in Type C tiles. Without a continuous backing, any passage of air between tiles or through holes in Type C tile will result, in time, in discoloring the tile at the edges (and also the holes in Type C)—due to dust being deposited by air currents. Provide a continuous backing by covering nailing strips (before fixing tile) with an unsaturated felt, building or roofing paper, weighing at least 50 lbs. per 100 sq. ft. This will effectively stop discoloration from dust deposits caused by air currents set in motion by temperature changes.

F11. ACOUSTI-CELOTEX — PAINTABILITY: So long as holes are not closed or filmed over, painting does not impair the sound-absorbing efficiency of Acousti-Celotex. The paintability of Acousti-Celotex is one of its outstanding qualities. Glue size before applying paints mixed with oil. Paint, or any stencil design in one or more colours, may be applied either before or after fixing, see Section E. It is usually much easier to decorate Acousti tile before fixing.

F12. ACOUSTI-CELOTEX — SIZES — ABSORPTION COEFFICIENTS, ETC.: TYPE BB: Sound Absorption Coefficient .70. Sizes 12 in. x 6 in., 12 in. x 12 in., and 24 in. x 12 in. Thickness 1¼ in. Weight per square foot 1 lb. 10 ozs. Packed respectively 184, 92 and 46 tiles per crate.

TYPE B. Sound Absorption Coefficient .47. Sizes 12 in. x 6 in., 12 in. x 12 in., and 24 in. x 12 in. Thickness 13/16th in. Weight per square foot 1 lb. 3 ozs. Packed respectively 272, 136 and 68 tiles per crate.

TYPE C. Sound Absorption Coefficient .30. Size 12 in. x 12 in. Weight per square foot 8 ozs. Packed 292 tiles per crate. Shipping weight, all Types, crated, approximately 220 lbs. per crate. The sound-absorbing values of Acousti-Celotex are based upon the standard frequency of 512 vibrations per second (a tone one octave above middle C).

All Acousti-Celotex tiles are drilled with 441 holes (1/16 inch diameter) per square foot. All Types may be ordered with bevelled, unbevelled, or trimmed edges. Bevelled edges are always supplied unless unbevelled or trimmed edges are specified.

Trimmed edges reduce size of 12 in. x 6 in. tile to 11 5/32nd in. x 5 5/16th in.; 12 in. x 12 in. tile to 11 5/32nd in. x 11 5/32nd in.; and 24 in. x 12 in. to 23¾ in. x 11 5/32nd in. Trimmed edge tiles are used to provide a uniform spacing of the holes over any given surface and to eliminate the tile effect. Note that more trimmed edge tiles must be ordered to cover a given area.

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PAXBOARD
DUMBOARD
PAXFELT
ACOUSTIC BLANKET

NEWALL'S INSULATION EXPORT CO. LTD.

Washington Station, Co. Durham, England

For Australian Distributors See Page 548

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S.A.A. File No.

Newall's Acoustic Products are available in the following materials for use according to conditions and requirements. The N.P.L. tests referred to below are those conducted by the National Physical Laboratories at Teddington, London. Sound Absorption efficiencies are given in cycles per second (c.p.s.).

Paxboard

"Paxboard" is a rigid honeycombed sound-absorbing sheeting, composed entirely of asbestos millboard, with a cellular backing and a facing of perforated white asbestos paper. It is not intended to reduce sound transmission, being manufactured exclusively for erection against the internal surfaces of buildings and structures to control acoustics by breaking up and altering the characteristics of sound waves impinging on it. Efficiency by N.P.L. test 40 per cent. at 500 c.p.s and 75 per cent. at 2,000 c.p.s. Standard sheets 3 ft. x 2 ft. x ¾ in. thick. Paxboard is light in weight, easily erected, readily decorated verminproof and **Fireproof.**

Dumboard

"Dumboard" is rigid light sheeting designed to replace the so-called "sound-absorbing building board" by a much superior article having double the efficiency and selling at a highly competitive price. It is the ideal material to fulfil, to a lesser degree, all the functions of "Paxfelt" and "Paxboard" at lower initial cost By N.P.L. test "Dumboard" has a practically flat "absorption curve" varying between 45 per cent. and 50 per cent. over a wide range of frequencies of 500 to 2,000 c.p.s., rendering it particularly useful in gramophone and radio testing rooms, broadcasting studios, etc. Standard sheets 3 ft. x 2 ft x 1 in. thick. It is easily erected, readily decorated, verminproof and **Fire-resisting.**

Paxfelt

"Paxfelt" is a 100 per cent. long strand asbestos sheeting specially prepared during manufacture to provide maximum sound absorption and minimum sound reflection. It is the ideal material to specify for the purpose of sound deadening and the prevention of sound transmission through structures. "Paxfelt" is also an excellent non conductor of heat and is extremely efficient in the correction of acoustics, its absorption by N.P.L. tests being 80 per cent at 500 c.p.s. and 70 per cent. at 2,000 c.p.s., and for this purpose it is extensively utilised in theatres and film studios. Standard sheets 3 ft. x 2 ft. x 1 in., 2 in. and 3 in thick, also highly compressed ¾ in. thick. It is light, readily fitted or incorporated in structures; may be decorated if required, is absolutely verminproof and **fireproof.**

Acoustic Blanket

"Acoustic Blanket" with or without Canvas Backing is supplied in rolls of 18 ft. long by 36 in. wide by approximately ½ in. thick The N.P.L. test for sound absorption at 500 cycles per second is 60 per cent. and at 2,000 cycles 70 per cent. The "Blanket" is fire-resisting, verminproof, and is unaffected permanently by moisture. It can be fitted round irregular surfaces which would be otherwise difficult to treat with rigid materials. The "Blanket" may be readily decorated or painted as required It is verminproof and **fire-resisting.**

T E N T E S T

INTERNATIONAL FIBRE BOARD LTD.

OTTAWA, CANADA

For Interstate Distributing Agents See Page 538

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S.A.A. File No.

TEN-TEST FOR ACOUSTICAL CORRECTION

(1) By Using Standard Ten-Test

Ten-Test is unequalled for the acoustic treatment of churches, talkie theatres, auditoriums and the like. Professor G R. Anderson, of the Toronto University, gives the co-efficient of standard $\frac{7}{16}$ in Ten-Test as .35, based upon the standard frequency of 512 vibrations per second. The Bell Laboratories give the following coefficients over a full range of frequencies

Frequencies	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Absorption Coefficients	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

The absorption coefficients given above are taken on the standard $\frac{7}{16}$-in board.

(2) By Using Special Acousti Ten-Test

A special Acousti Ten-Test is available, which is especially manufactured for acoustical correction and sound-quietening, and when properly applied it makes possible the distinct hearing of speech and music free from echoes thus being ideal for use in radio broadcasting studios and all types of public buildings

Acousti Ten-Test gives the following coefficients over a full range of frequencies (Reverberation Chamber Test):

Frequencies	64	128	256	12	102	048
Absorption Coefficients	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	75

Authority H Vivian Taylor & Soilleux Acoustic Consultants Henty House Little Collins Street Melbourne

The use of Acousti Ten Test ensures the provision of adequate absorption from the lowest notes to the top of the vocal and instrumental register This point cannot be given too much consideration in the selection of an acoustical corrective material, as it will ensure the best conditions obtainable both for music and speaking.

Interior view of the Victoria Theatre, Richmond, Vic., showing Acousti Ten-Test on Rear Wall, and 7/16 in board on Ceiling, Bio-Box, and side walls.

It should be noted that the relatively uniform lineal rate of absorption throughout the entire range of vibration frequencies is a far more desirable quality in an acoustical absorbing material than high peaks of efficiency for limited pitche.

Acousti Ten-Test is manufactured in 12 in. x 12 in. boards, and can be fixed either by nailing or cementing to any kind of a level base.

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S.A.A. File No.

"DONNACONA"

GOLLIN & CO. PTY. LTD., 561 BOURKE ST., MELBOURNE

TELEPHONE C 9180

Acoustical Value

The acoustical value of Donnaconna Board depends on the character of the wood fibre entering into its composition and on the surface of the board itself; due, therefore, to this cellular composition and rough surface Donnaconna Board has a marked ability to control reverberation, whether left in its natural condition or stained with non-sealing wood stains or aniline dyes

Sound Insulation

As a sound insulator Donnacona Board is remarkably effective and will deaden the transmission and passage of noise, particularly in framed construction, where this nuisance is most prevalent. The cost of installation is comparatively small and the results last the lifetime of the building

Table of Absorption Frequency Characteristics

Frequency in cycles per second	128	250	500	1000	2000	4000
Percentage of incidence in sound absorption	26.8%	22%	18.3%	25%	33%	37.5%

A close-up view of Donnacona Building Board showing texture.

Extract from Report

Extract from a report of a sound absorption test on Donnacona Insulating Board by Messrs. H. Vivian Taylor and Soilleux, architectural acoustic consultants:—"The result of the test indicates that the Board has definite acoustical merit In nearly every case of acoustical treatment the greatest difficulty is experienced in obtaining the absorption of the lower frequencies. The relatively high absorption at the lower end of the scale of pitch is a valuable attribute. The falling off in absorption about the middle register should also be regarded as an advantage, as the normal effect of an audience or carpets or furnishings is to absorb these frequencies. The ultimate effect would, therefore, tend to a straight line total room absorption, a very desirable feature in acoustic design"

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S.A.A. File No.

TREETEX

HARDWOODS (AUSTRALIA) PTY. LTD.

34 QUEEN STREET, MELBOURNE, C.1

TELEPHONE. C.3855

Acoustics

In selecting a material for the attainment of good acoustic conditions great care is necessary to ensure that the desired result is obtained. Many materials are found to absorb sound efficiently at high frequencies only, and if these are used the resultant confusion may be worse than the original, as the upper notes may be deadened out whilst the lower notes are left unaffected

Some materials have an absorption of as much as 70 per cent. at a frequency of, say, 2,048, while, at a low frequency, they absorb less than 10 per cent. of the sound which strikes them. The higher notes are deadened almost completely whilst the lower notes are practically unaffected, with a result which can be better imagined than described. A board with an even absorption of sound of 25 per cent. to 30 per cent. is of infinitely more general use than one such as is described above

Appearance is another item of importance, as no decoration which fills the surface pores should be employed. In the case of "Treetex," any colour scheme can be carried out by use of alcohol stains, on account of its light-coloured, artistic surface, or, if left untreated, its light reflection qualities are ideal

Sizes and Packing Details

INSULATING WALLBOARD, full ½ inch thick. 8, 10, 12, 14 feet long by 3 and 4 feet wide. Packed 12 sheets per crate. Weight, 55 lbs. per 100 sq. feet

"Treetex" Products also Include

Insulating Wallboard, ½ inch thick. 8, 10, 12 feet long x 3 and 4 feet wide Packed 16 sheets per crate

Carpet Lining, ½ inch thick. 5 feet x 3 feet and 6 feet x 3 feet. Packed 21 sheets per crate.

Plaster Base, full ½ inch thick, 18 inches long x 18 inches wide. Long edges rebated All edges bevelled Packed 20 sheets per crate.

Sound Deadening

Various methods are employed to deaden noise, amongst the chief of which may be mentioned the use of felts and quilts of different types, which are placed on walls or ceilings and beneath floors for the purpose of absorbing sound. The ability of a material to absorb sound depends almost entirely on its density.

"Treetex" is a material which, whilst being of a sufficiently low density to have a very high absorption, is of sufficient structural strength to maintain its cellular structure under very heavy pressure and is so strong as to be eminently capable of replacing other materials, such as lath and plaster, wood lining or panelling and consequently often shows an actual saving in material and labour whilst giving a very high degree of sound deadening

Density

13.1 lbs. per cubic foot.

Strength Tests

Tensile strength 289 lbs. per sq. in
Modulus of rupture—467 lbs. per sq. in
Modulus of elasticity 37,400 lbs. per sq. in

Conductivity

.266 B.T.U.'s per sq. foot per 1 inch thickness per degree difference in temperature per hour.

Co-Efficient of Sound Absorption

Frequency: (vibrations per sec.)	256	512	1024	2048	4096
Co-efficients	.25	.27	.26	.25	.22

Authority: Paul E. Sabine, Riverbank Laboratory, U.S.A.

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Now in the Press

RAMSAY'S ARCHITECTURAL AND ENGINEERING SPECIFICATIONS

An Authoritative Australian Specification Manual written and compiled for Architects, Engineers and others for use in the preparation of Specifications covering Buildings and Allied Structures.

RAMSAY

Published and Distributed by:

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Editor:

WILLIAM L. RICHARDSON, B.Sc.

The specimen pages overleaf are typical of the style and matter contained in the pages of Ramsay Specifications. See 4th page of this folder for Table of Contents.

Price 10/-

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GENERAL CONDITIONS—O
(CONTINUED)

Services

STORAGE SHEDS

(40) Provide a suitable (substantial) weathertight shed(s) for the storage of (tools), cement, lime, *(name any other materials)*, drawings, etc., with tight raised wood floors or platforms.

TEMPORARY OFFICE

(41) The Contractor shall erect and maintain, upon the premises where directed, an (approved) temporary weathertight (dustproof) office for the use of the Architect (Engineer) (Clerk of Works) (and his representatives) with a floor area of ... ..square feet and furnished with suitable ..... (table) (bench), plan rack and chairs, having adequate windows for proper lighting and complete with a stout padlocked door.

WATER FOR BUILDING

(42) The Contractor shall arrange for a temporary water supply and pay for all water used during the construction of the building.

SANITARY ARRANGEMENTS

(43) The Contractor shall at the beginning of the work provide a suitable temporary enclosure and conveniences for the use of the men on the job, and shall maintain the same in a sanitary condition. At the completion of the job the enclosure and its contents shall be removed entirely from the site.

(44) (Take all precaution to maintain the site clear and remove any excrement deposited in or about the building.)

(45) [Do any other necessary cleaning to keep the building and premises in a sanitary condition as directed by the ..... (Architect) (Engineer).]

TELEPHONE SERVICE

(46) The Contractor shall provide in
(a) (his office)
(b) [the Architect's (Engineer's) temporary office)
a telephone(s) for ....
(c) (the use of all employed about the building)
(d) [the exclusive use of the Architect (Engineer) and his assistants (representatives).].

(47) He shall pay for the installation, removal and all local calls.

ELECTRICAL ENERGY

(48) The Contractor shall arrange for and install a temporary electrical supply for the use of the building including power for testing lifts, and for the operation of floor surfacing and polishing machines. He shall pay for such installation, together with cost of extentions and current used.

(49) (When the distribution system is installed in the building he may change over to the same, provided the system is not overloaded.)

PHOTOGRAPHS

(50) The Contractor shall supply monthly photographs showing the progress of the Works giving ....., (one) (two) view(s) of the building from points selected by the .. .... (Architect) (Engineer).

(51) [Photographs shall be . ..... (10" x 8") in size.]

Technical

SUPERVISION

(55) The whole of the work covered in this Contract shall be carried out to the entire satisfaction of the Architect (Engineer) (or his representative.)

DRAWINGS

(56) The Contractor shall be supplied free of charge all copies of Drawings and Specifications reasonably necessary for the carrying out of the work.

(57) [Upon completion of the work the Contractor shall return all Drawing and Specifications to the . (Architect) (Engineer).]

SETTING OUT

(58) The Contractor shall set out the lines and levels of the building after .....
(a) [the ..... (Architect) (Engineer) has given him the starting points]
(b) [checking them with the copy of the survey supplied by the .....(Owner) (Architect)]
employing, if necessary, at his own expense, a competent surveyor.

(59) (The Contractor shall be responsible for the accuracy of the whole work throughout its progress; he shall make good at his own expense all errors caused by his negligence or workmanship.)

(60) [He shall keep on the job at all times, (a) suitable instrument(s) for checking lines or levels and allow the ..... (Architect) (Engineer) unrestricted use of same at all times.]

MEASUREMENTS

(61) Before commencing any work (or ordering materials), the Contractor (Sub-Contractor) shall verify all measurements at the building.

PROTECTION OF PUBLIC

(62) The Contractor shall provide and maintain all temporary footpaths, passageways, elevated platforms, covered ways, fences, or other structures as required by law, and adequately light same so as to secure the safety or convenience of the public.

FOREMAN SUPERVISION

(63) The Contractor, if absent from the Works, shall leave a fully authorised and competent Foreman to act on his behalf and be in charge of the work.

(64) (The Contractor shall keep on the Works a capable and approved General Foreman, who shall be continuously in charge of the work until its completion.)

(65) (All instructions given to him shall be as binding if given to the Contractor.)

INSPECTION

(66) The Architect (Engineer) (or his representative) (Owner) shall at all times have access to the work whenever it is in preparation or progress, and the Contractor shall provide proper facilities for such access and for inspection.

MATERIALS AND WORKMANSHIP

(67) Unless otherwise specified, all materials shall be new and the best quality of their several kinds.

(68) All mechanics of the various trades employed on the building shall be skilled workmen under the charge of a competent foreman.

SCAFFOLDS, TOOLS, ETC.

(69) The Contractor shall provide and erect all the necessary platforms and scaffolds of ample strength required for the handling of the materials, and all appliances and tools needful for the completion of the work.

SAMPLES

(70) The Contractor (Sub-Contractor) shall submit to the ... (Architect) (Engineer), for his approval, samples of material (with specimens of labour furnished therein) whenever requested.

(71) (All materials and workmanship in the building shall conform to the approved sample.)

(72) [The term "approval" or "approved" shall mean approved by the (Architect) (Engineer).]

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THE ASSEMBLY OF SPECIFICATION DATA—(CONTINUED)

No matter how or where the data comes from, it is practically useless as long as no adequate provisions are made for its retention. The advantages of all the material in a bound book is obvious—a book containing such is in itself a filing system and an ideal way of receiving information on building products and equipment. "Ramsay's Catalogue" is such a book, yet it has a limit as regards the amount of specification information it makes available. In itself it is a source of specification material and along with other bound books should occupy its place on the Drafting Room shelves.

A filing system for the office or drafting room is absolutely essential if anything in the way of technical information other than bound books is to be studiously kept. The filing system promulgated by the Standards Association of Australia and known as "The Standard Classification for Building Materials and Equipment" is, we believe, the most simple and satisfactory method of filing loose pieces of technical literature. The size of all pieces entering the file should be approximately 11 in. x 8½ in., and be marked with the index number in two places —at the lower right-hand corner and the upper left-hand corner. The 41 main divisions are as follows:

Section No. 1.—Preparation of Site;
" " 2.—Excavation;
" " 3.—Masonry Materials;
" " 4.—Concrete and Monolithic Construction;
" " 5.—Brick Work;
" " 6.—Foundations;
" " 7.—Waterproofing and Damp-proofing;
" " 8.—Stone Work;
" " 9.—Terra Cotta;
" " 10 Block Construction;
" " 11.—Paving, Kerbs, Gutters, Pavement Lights, etc.;
" " 12.—Roofing, Skylights, and Sheet Metal Fittings;
" " 13.—Structural Steel and Iron;
" " 14.—Miscellaneous Steel and Iron;
" " 15.—Ornamental Metal Work and Materials;
" " 16.—Fire Resisting Doors, Windows, and Finishings;
" " 17.—Special Doors and Windows;
" " 18.—Vaults, Safes and Strong-rooms;
" " 19.—Carpentry and Joinery;
" " 20. Furring and Lathing;
" " 21.—Plastering;
" " 22.—Marble, Slate, Soapstone, Bluestone, Structural Glass Terrazzo;
" " 23.—Floor and Wall Tiles,
" " 24.—Plastic Floors;
" " 25.—Paint, Painting and Finishing;
" " 26.—Glass and Glazing;
" " 27.—Hardware;
" " 28.—Furnishings,
" " 29. Plumbing;
" " 30.—Heating and Ventilating,
" " 31.—Electrical;
" " 32.—Refrigeration;
" " 33 Lifts—Escalators, Conveyors and Accessories;
" " 34.—Power Plant;
" " 35.—Equipment;
" " 36.—Construction Plant;
" " 37.—Insulation;
" " 38.—Landscape;
" " 39.—Acoustics;
" " 40.—Regulations;
" " 41.—S.A.A. Standards.

Although the foremost purpose of this filing system is for the reception of manufacturers' catalogues, bulletins, circulars, etc., we have found that a wider use may be made of it for the main divisions cited above are, with slight modifications, the usual chapters used in the make-up of Specifications.

In actual practice the office of the Ramsay Standard Catalogue Service Pty. Ltd. uses the S.A.A. Filing divisions for the repository of not only catalogues, bulletins, specification sheets, etc., but many miscellaneous pieces of useful literature as magazine articles on building construction, engineering, equipment, and any other matter of ultimate usefulness.

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